


**TCFD
REPORT
ECOPETROL**

2021




CONTENTS

Chapter 1 Governance	CEO Letter	04
	1.1 The Board of Directors' oversight of climate-related opportunities and risks	07
	The Board of Directors' profiles	07
	Committees of the Board of Directors	08
	1.2 Management's role in assessing and managing climate-related opportunities and risks	12
	Training on climate - related matters	16
	Variable compensation and incentive structure linked to climate-related goals	17

Chapter 2 Strategy		
	Capital allocation and investment criteria in TSEG-focused initiatives and projects	26
	2022-2024 Investment plan	26
	Investment Criteria for TSEG and Energy Transition Projects	27
	2.1 Climate-related risks and opportunities	28
	Physical risks	29
	Transition Risks	30
	Climate- related opportunities	33
	2.2 Impact of climate-related opportunities and risks on the Company's business, strategy and financial planning	38
	2.3 Scenario analysis	40

Chapter 3 Risk Management	3.1 Integrated Risk Management System	43
	3.2 Climate-related risks in the Business Risk Map	44
	3.3 Business risk alignment with TSEG Strategy and the General Value with Sustainability pillar of the 2040 Strategy	48

Chapter 4 Metrics and Targets	4.1 Climate-related targets	51
	4.2 Metrics to assess climate-related opportunities and risks	54
	Metrics related to GHG emissions	54
	Other environmental metrics	56

Chapter 5 TCFD table of contents		
	Glossary of Acronyms	62



For the second consecutive year, the Ecopetrol Group presents its progress in understanding the climate-related risks and opportunities, aligned with the recommendations issued by the Financial Stability Board's Task Force on Climate-Related Financial Disclosure (TCFD).

This Report presents our progress in decarbonization, the mechanisms through which the Board of Directors provides guidelines and oversight on T ESG and corporate responsibility matters, including climate-related issues. Additionally, it includes a detailed description of the "Generate Value through T ESG" pillar of the 2040 Strategy, the processes to identify and manage climate change risks and opportunities, and the metrics used by the Company to track and monitor these.

In February 2022 we launched the 2040 Strategy so-called "Energy that Transforms", strengthening the Ecopetrol Group's leadership in Colombia and the region, which integrates our corporate culture principles, higher purpose, our energy transition roadmap and long-term portfolio. "Energy that Transforms" strengthens our stance towards being an agile and dynamic organization that promptly adapts to the changes facing the energy industry, the challenges of a world advancing in the generation and use of clean energy, moving ahead towards growth opportunities and leadership in the American continent.

The Ecopetrol Group seeks to continue growing and generating value in our three business lines: hydrocarbons, low-emission solutions, and energy transmission and toll roads. This will be achieved



by maximizing the value and competitiveness of the hydrocarbon business, as well as by ensuring the diversification of our portfolio with the growth of low-emission businesses, which incorporates hydrogen, carbon capture, utilization and storage (CCUS) and natural climate solutions (NCS), among others. We continue committed to T ESG and decarbonization, with technology at the core of our activities and leveraging cutting-edge knowledge.

We understand the challenges the Ecopetrol Group faces, and that is why we have decided to consolidate our position as leading integrated energy Group in Latin America, competitive in the traditional business and at the forefront of the energy transition to address climate change. The acquisition of 51.4% of the outstanding shares of Interconexión Eléctrica S.A. E.S.P. (ISA) contributed to the materialization of that ambition and drives our growth in Colombia and the region, paving the way to electrification through a low-emissions business and tallying significant contributions in the decarbonization roadmap.

We ratify our commitment to the 2030 Sustainable Development Agenda. Our participation in the UN Climate Change Conference (COP26) in Glasgow allowed us to continue positioning the Ecopetrol Group's efforts to mitigate climate change and the decarbonization of our operations, and to gain first-hand knowledge of global expectations, and incorporating these objectives into our strategy. We continue to make rigorous and organized progress towards our ambitious goal to achieve scope 1 and 2 net-zero carbon emissions by 2050 via a decarbonization plan that includes - among others - operation initiatives, reducing fugitive emission and venting, decreasing gas flaring, and incorporating renewable energy projects, among others.

We want our stakeholders to know about the Ecopetrol Group's efforts to minimize the impacts and maximize the shared value derived from our operations. In this sense, we continue to strengthen our T ESG reporting ecosystem, in line with international standards and best practices.

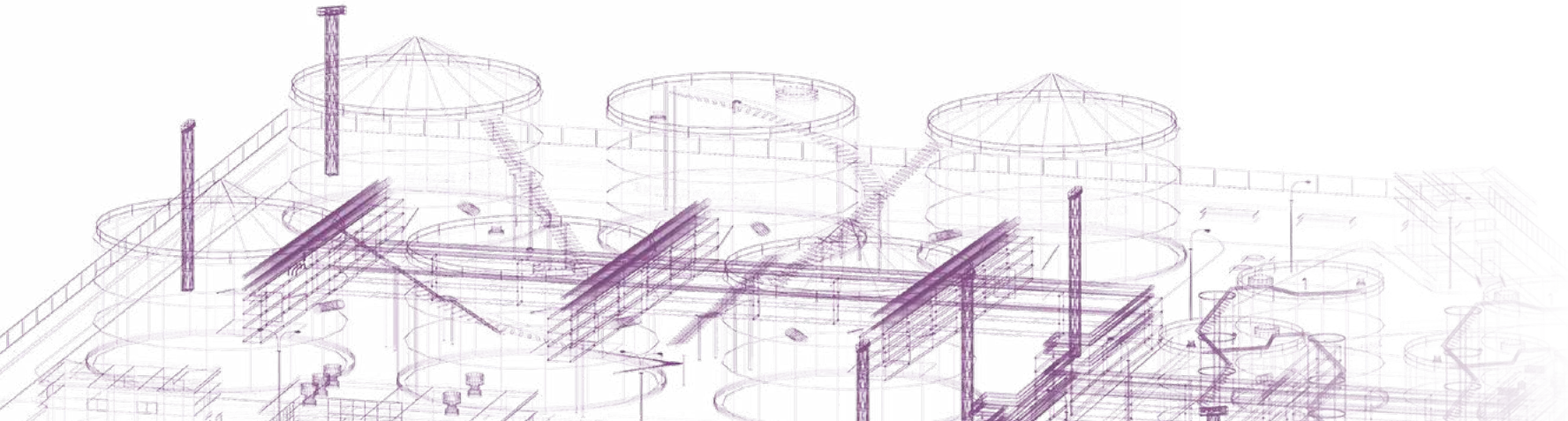
In order for our communications to be transparent and thorough, we follow the guidelines of the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB) to

construct our Integrated Sustainable Management Report. We voluntarily participate and disclose international reporting standards and metrics including the Dow Jones Sustainability Index (DJSI), the World Economic Forum's Stakeholder Capitalism Metrics (SCM-WEF) and CDP Climate and CDP Water.

Throughout this document, reference is made to other complementary reporting systems to better comprehend this Report, such as Integrated Sustainable Management Report, the 20-F Report filed to the U.S. Securities and Exchange Commission (SEC), the Corporate Governance Report and SASB, among others.

The new social and economic reality, along with the challenges posed by the fight against climate change, are the driving forces that underpin our commitment with the Country and with the energy transition. We will continue working diligently to generate value for our stakeholders, capitalizing on opportunities aligned with our 2040 Strategy through organized and decisive progress in our decarbonization plan, within the framework of our Country's energy security and of the regions in which we operate as a Group.

Felipe Bayón
CEO Ecopetrol S.A



01 GOVERNANCE

The Ecopetrol Group has a solid corporate governance model based on transparency, governance and control practices. During 2021, the corporate governance model served as the basis for updating the Group's strategy to tackle current and future challenges associated with climate change, decarbonization and accelerated progress in technology and innovation. This strategy was released to the markets in February 2022.

1.1 The Board of Directors' oversight of climate-related opportunities and risks

The Board of Directors (the "Board") defines and provides oversight of the strategy of Ecopetrol S.A. and its group of companies (the Ecopetrol Group). Issues concerning the TESG pillar of the 2040 Strategy are constantly reviewed and addressed, including climate change and energy transition, among others.

The Board is responsible for guiding the Company in defining its strategic to create long-term value. For this reason, in December 2021, the Board approved the **2040 Strategy "Energy that Transforms"**, the first time the Company has defined a strategy for more than 10 years. This strategy seeks to generate growth with the energy transition by maximizing value for the various stakeholders; the competitiveness in the hydrocarbon businesses; and accelerating portfolio diversification. At the same time, it generates value through TESG, ensuring the decarbonization of operations and leveraging on technology, innovation and human talent to deliver competitive returns. The Strategy section of this report provides greater detail of its focus.

Additionally, for over two (2) years, the Ecopetrol Group assessed, structured and executed the **acquisition of a 51.4% stake of Interconexión Eléctrica S.A. E.S.P. (ISA)**, the leading energy transmission group in Latin America. On August 20, 2021, this transaction was successfully completed, positioning the Ecopetrol Group as a regional leader in energy transition and

decarbonization, diversifying its operation towards low-emission businesses, essential to increase electrification. The investment is supported by the growing demand for energy and the inclusion of renewable sources in the energy matrix (for further information regarding this acquisition, refer to the **20-F Annual Report, Related Party and Intercompany Transactions: ISA Acquisition** section pp. 96-97).

The Board of Directors' profiles

The members of the Board of Directors have diverse skills, experience and strong business abilities. During 2021, the Board implemented its **Succession Policy** and its **Competencies and Experience Matrix** to establish the requirements for the performance of its duties, classified as basic and complementary. Among the complementary requirements related to climate change, the following stand out:

- (i) **Health, safety and/or environment: 6 board members**
- (ii) **Energy industry and/or energy transition: 4 board members**
- (iii) **Sustainability: 6 board members**
- (iv) **Technology and/or innovation: 6 board members**

(For further information on Board members and the aptitudes, consult the **2021 Annual Corporate Governance Report**, Chapter 4. *Operation of the Board of Directors and its Committees*, pp. 24-34; and the **Board of Directors'** website section).

The Board regularly reinforces its knowledge and experience in climate change. For example, the Board of Directors' Chairperson participated in the UN Climate Change Conference (COP26) held in Glasgow, which brought together world leaders from all the sectors. There, issues related to the country's contribution to the global goal of reducing GHG emissions by 2050 were discussed, including methane emissions, the need to build resilience measures to protect communities and natural habitats, and the mobilization of resources for climate financing. The Ecopetrol Group presented its progress in climate change management as a contribution to national goals and generated collaborative partnerships to contribute to the achievement of the objectives of the Paris Agreement.

Committees of the Board of Directors

During 2021, presentations and contributions made in the different committees and Board of Directors meetings addressed general issues and challenges concerning the Ecopetrol Group's strategy in the face of climate change and energy transition, as follows:

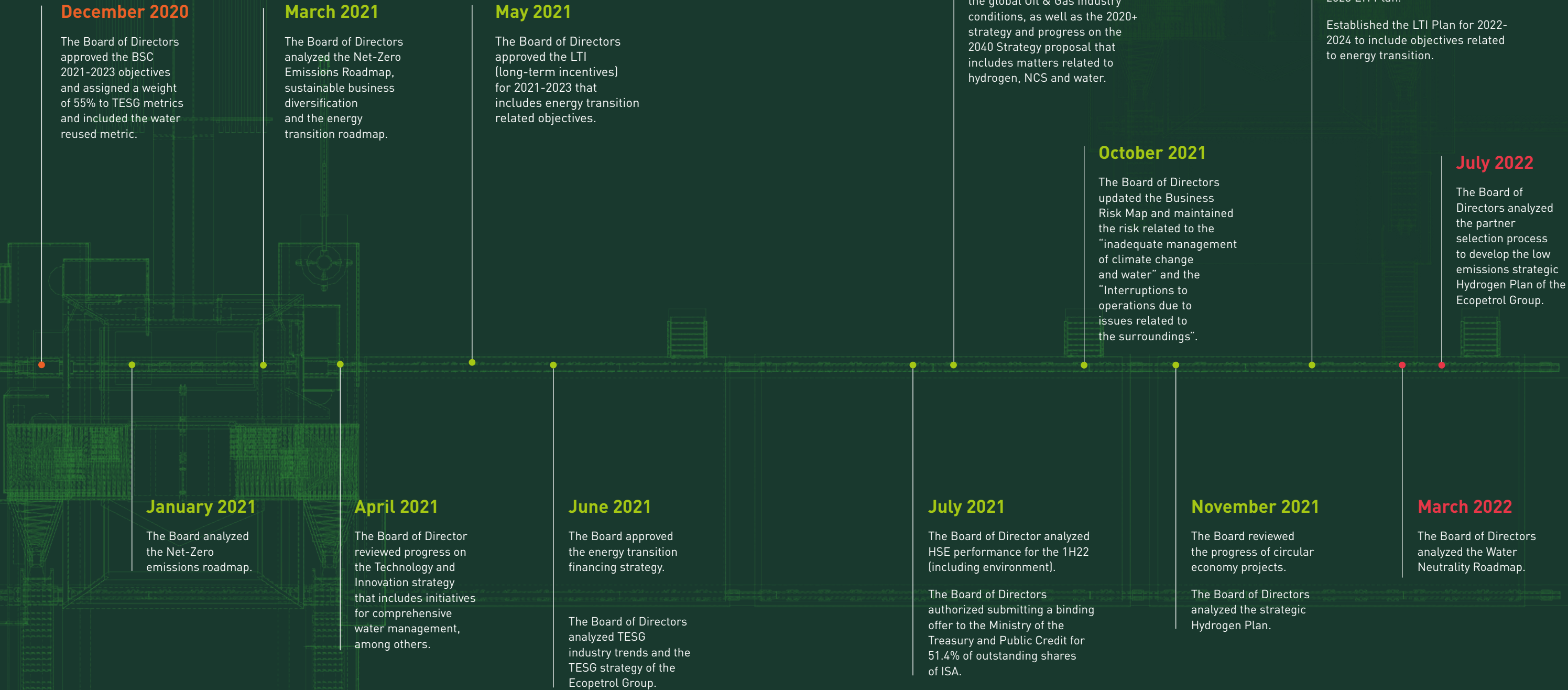
- (i) The **Audit and Risk Committee** oversees business risks, including matters related to TSEG and the Business Risk Map, which incorporate the risks associated with climate change and water. Additionally, during 2021 it reviewed the financing of the energy transition strategy (14 sessions in 2021).
- (ii) The **Corporate Governance and Sustainability Committee** supports analysis and decision-making related to the "Generate Value through TSEG" pillar of the 2040 Strategy. In 2021, it reviewed trends in technology, TSEG, as well as corporate responsibility, human rights, and corporate governance issues (7 sessions in 2021).
- (iii) The **Health, Safety and Environment (HSE) Committee** is responsible for guiding, in addition to health and industrial and process safety issues, the environmental strategy that includes climate change and water management. In 2021, it analyzed the Net-Zero Emissions Roadmap and progress on circular economy (3 sessions in 2021).
- (iv) The **Technology and Innovation Committee** in 2021 assessed issues related to TSEG and evaluated the technological components that will contribute towards the generation of long-term value to make operations increasingly responsible, safe, and efficient, in harmony with the environment (3 sessions in 2021).
- (v) The **Business Committee** reviews the emissions profile of each project, as well as business opportunities and risk and investment management. During 2021, it analyzed in a joint session with other Committees, the Net-Zero Emissions Roadmap and the diversification of low emissions businesses, among others (17 sessions in 2021).
- (vi) The **Remuneration, Appointments and Culture Committee** reviews and approves matters related to variable compensation, which includes the Ecopetrol Group's Balanced Scorecard (BSC) and the Long-Term Incentive Plan. In 2021, the committee oversaw the performance of the 2020-2022 and 2021-2023 BSC and with the Board of Directors approved the 2022-2024 BSC (8 sessions in 2021) For more information on variable compensation and incentive structure that respond to climate-related objectives, see the Variable compensation section of this report.
- (vii) The **Special Committee for ISA's valuation** was created on March 25, 2021, in the context of the potential transaction that would allow the Group to acquire the Ministry of Finance and Public Credit controlling stake in ISA. The Special Committee acted as a temporary mechanism to evaluate the valuation of ISA, the price range and/or the price of the potential transaction and make the necessary recommendations to the Board of Directors. It met for the last time on August 5, 2021 (8 ordinary sessions and 14 informal sessions in 2021). The Board of Directors and its supporting committees also analyzed this acquisition from different angles in several sessions: the Corporate Governance and Sustainability Committee met once on this issue, the Audit and Risk Committee twice, the Business Committee 10 times and the Board of Directors 15 times.

(For further information on the Board of Directors and its Committees, refer to the **Integrated Sustainable Management Report 2021**, *Governance* chapter pp. 132-149) and the **Form 20-F Annual Report Filing**, *Governance* section pp. 205-213).

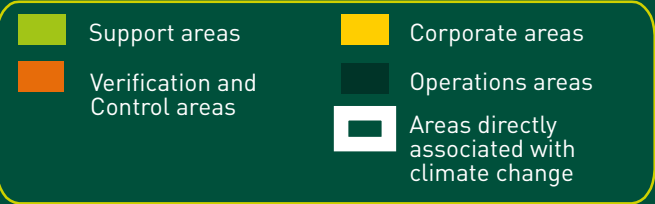
The main climate change related subjects addressed by the Board (see Figure 1):

Figure 01.
Key Climate change related issues discussed
by the Board of Directors

Timeline

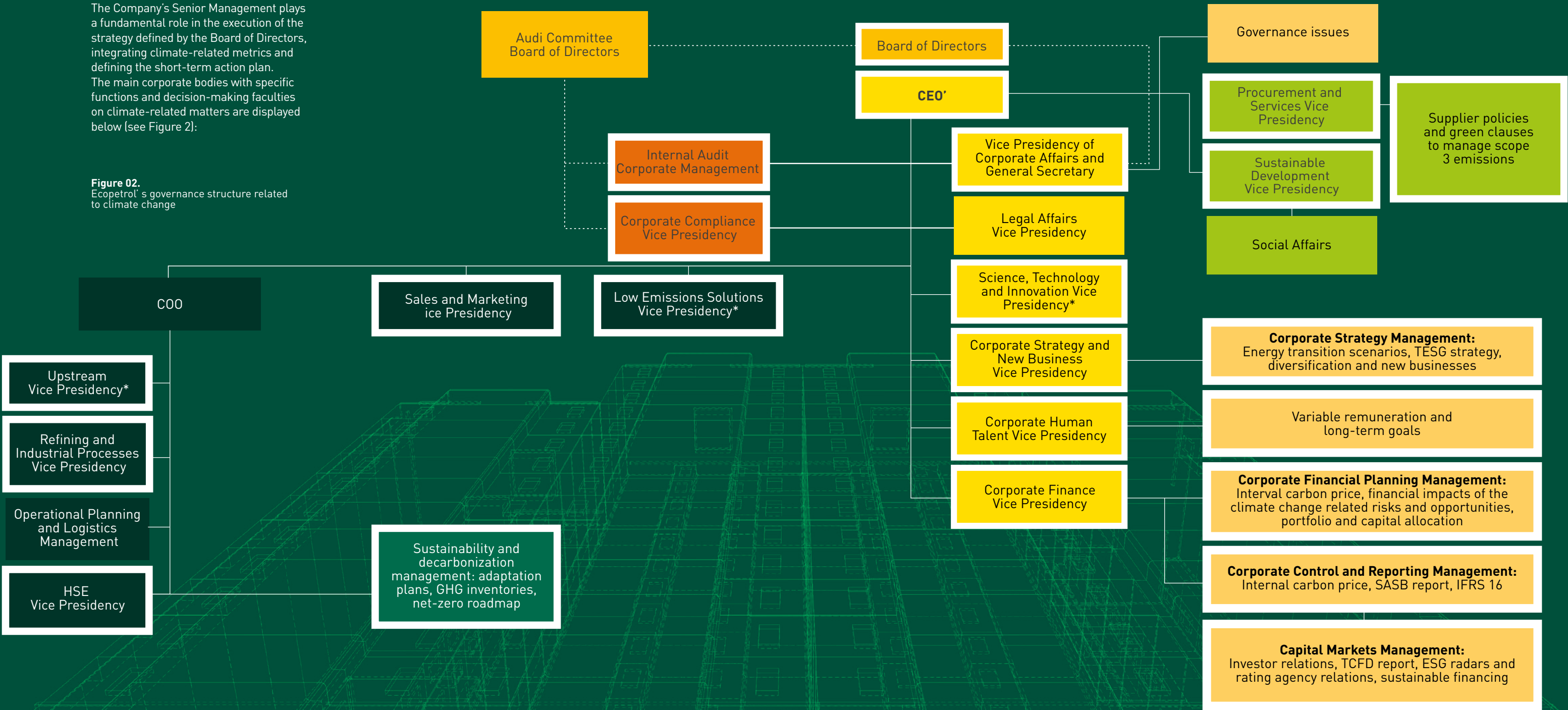


1.2 Management's role in assessing and managing climate-related opportunities and risks



The Company's Senior Management plays a fundamental role in the execution of the strategy defined by the Board of Directors, integrating climate-related metrics and defining the short-term action plan. The main corporate bodies with specific functions and decision-making faculties on climate-related matters are displayed below (see Figure 2):

Figure 02. Ecopetrol's governance structure related to climate change



The CEO

The 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, as well as the Company’s Balanced Scorecard (BSC) and communicating progress to the Board.

The Executive Committee (ExCo)

The ExCo is comprised of nine (9) executives from the company’s segments and key corporate roles of the company. It is responsible for supporting Ecopetrol’s CEO in the monitoring and approval of strategic issues, including topics related to business goals, objectives and initiatives that cut across more than one of the Ecopetrol Group’s segments related to climate change and the decarbonization plan.

In addition, within the duties of the ExCo is knowing and monitoring business risks. Within this framework, the Compliance Vice Presidency (VCU for its Spanish acronym) periodically presents all business risks, which are broadly reviewed by the ExCo.



Management Level

The duties performed by the Vice Presidencies with the greatest impact on climate change management are:

- **C00: leads the Company’s operations, as well as** the execution of initiatives related to the Decarbonization Plan, the implementation of the Net-Zero Emissions Roadmap for the hydrocarbon business, and the targets for the improvement of fuels quality.
- **Low Emission Solutions Vice Presidency (formerly Gas Vice Presidency):** the transformation of this vice presidency responds to the Group’s new 2040 Strategy with which it expects to continue its growth and lead the energy transition in Colombia and the continent. It integrates areas of gas, biogas, liquefied petroleum gas (LPG), energy, renewables, hydrogen and carbon capture, utilization and storage (CCUS) and leads the development of the Company’s energy transition strategy.
- **Corporate Strategy and New Businesses Vice Presidency:** designs the strategy related to the energy transition, which includes identifying and implementing low emission opportunities, providing analysis and defining energy transition scenarios.

- **HSE Vice Presidency:** directs and manages the definition and implementation of the environmental strategy, industrial safety, process safety, occupational health, based on the use of management systems, standards, good practices and HSE assessments to evaluate the Company’s performance, identify gaps and create intervention plans.

Under this vice presidency is the **Sustainability and Decarbonization Management**, in charge of guiding all matter related to climate change, biodiversity, and circular economy. Specifically concerning climate change, it leads the implementation of the Decarbonization Roadmap, defines the emission reduction and offset goals, performs the corresponding analysis and follow-up to reaching said goals, manages the Atmospheric Emissions Management System (SIGEA for its Spanish acronym), defines the guidelines for managing emissions offsets, and establishes the actions for adapting to climate change to reduce climate-related vulnerabilities and risks.

Other VPs that hold a key role are summarized below:

- **Vice Presidency of Corporate Affairs and General Secretary:** leads the Corporate Governance of the Company, including acting as Corporate Secretary of the Board of Directors and its committees. It also oversees reporting governance (including the ISMG, the DJSI, SCM, CDP climate and water, among others), TSEG monitoring and analysis, and the roadmaps of the material elements.
- **Corporate Compliance Vice Presidency:** responsible for the Integrated Risk Management System and the management of business risks, including the risks associated with climate change and energy transition.
- **Corporate Finance Vice Presidency:** leads the implementation and analysis of the internal carbon price, portfolio management, and capital allocation. Assesses and analyzes the financial impact of climate-related opportunities and risks and sustainable financing alternatives. Likewise, it leads investor relationship programs such as *Climate Action 100+* and *Net-Zero Asset Managers Initiative*, as well as with risk rating agencies and ESG analytics (ex: MSCI and Sustanalytics, among others). It is responsible for coordinating and publishing the TCFD and SASB reports.
- **Upstream Vice Presidency (formerly Vice Presidency of Development and Production):** leads the implementation of decarbonization projects and climate change adaptation initiatives for Exploration and Production operations.
- **Vice Presidency of Sales and Marketing:** participates in the process of estimating GHG emissions from hydrocarbon operations up to their commercialization and manages the acquisition of carbon credits to supply the internal demand of the Ecopetrol Group and be able to offset emissions associated with some products sold by the Company.
- **Refining and Industrial Processes Vice Presidency:** responsible for identifying, assessing, and implementing initiatives aligned with the Company’s energy transition, decarbonization, and comprehensive water management strategy.
- **Science, Technology and Innovation Vice Presidency:** leads the technological and digital transformation to leverage the TSEG pillar of the corporate strategy, as well as for decarbonization and energy transition.

Training on climate - related matters

The Human Talent Vice Presidency provides the training content required within the strategy of the Vice Presidency of HSE and the Vice presidency of the Low Emission Solutions to train the leaders of the Ecopetrol Group in the basic concepts of climate change, circular economy, energy transition, and decarbonization.

In 2021, training sessions continued to be provided on issues related to climate change, energy transition, energy efficiency, water management, strategy and environment, in order to encourage operational improvement actions to reduce the use of resources and mitigate the impact on the environment from the activities carried out by the Company. In 2021 and so far in 2022, 5,036 hours of training were completed for Ecopetrol Group leaders on the aforementioned matters.

THE ECOPETROL GROUP HAS PRIORITIZED THE ENERGY TRANSITION BY INCLUDING SPECIALTIES SUCH AS DECARBONIZATION, ENERGY EFFICIENCY, CIRCULAR ECONOMY, RENEWABLE ENERGIES AND FUEL QUALITY WITHIN THE TRANSVERSAL SKILL SETS THAT IT SEEKS TO DEVELOP AND STRENGTHEN BY 2040 WITHIN ITS WORKFORCE.

To date,

2,426

Group workers

have completed general training in energy transition with the French Petroleum Institute - IFP School and

306

workers

in one of the aforementioned specialties. Likewise, in May 2022,

13

workers

were selected to carry out a master's program in the energy transition.

Furthermore, the Group is part of the National Carbon Neutrality Program (PNCN for its Spanish acronym), one of the pillars of the Colombia Carbon Neutrality Strategy (ECCN for its Spanish acronym) headed by Ministry of the Environment and Sustainable Development, which seeks to dynamize, strengthen and increase the visibility of the management of GHG emissions in Colombian



public and private organizations. The program provides guidance on measuring and managing GHG emissions and the alignment with the country's climate goals for 2030 and 2050, through training sessions to incorporate the culture of sustainability into financial and operating models. In 2021, the Ecopetrol Group participate in the training program that linked organizations that have GHG reduction targets and are seeking to strengthen their abilities to incorporate carbon neutrality in the company's activities. The program's duration was 20 hours distributed in eight (8) sessions.

Variable compensation and incentive structure linked to climate-related goals

The Company has two (2) components within its compensation structure associated with the achievement of business results:

- (i) Short-term variable compensation (VC): remuneration based on the Company's results and individual performance. Aligns workers with the annual business objectives defined in the BSC. Every year-end, the VC of each worker is calculated based on their individual goal, which corresponds to a percentage of their annual salary.

The model of the short-term VC is as follows (see Figure 3):

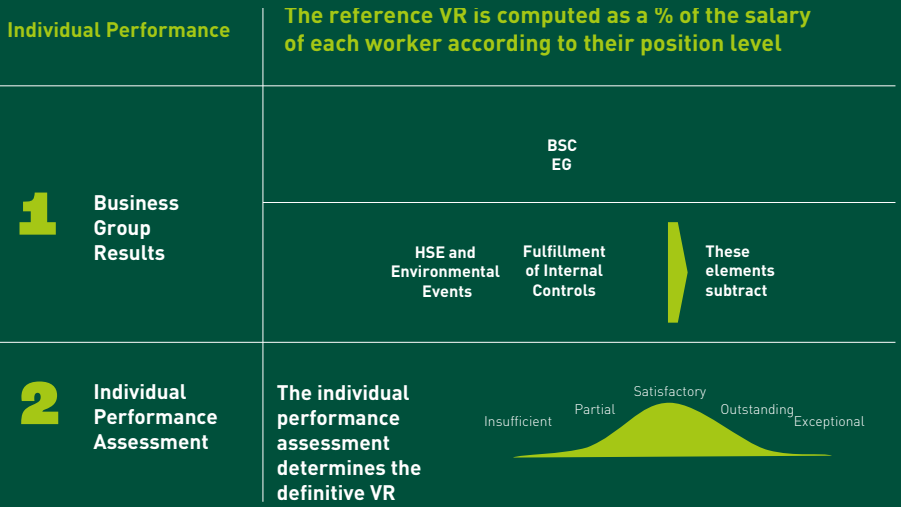


Figure 03. Short-term variable compensation model of the Ecopetrol Group.

For 2021, the BSC of the Ecopetrol Group integrated the relevant topics of the Business Plan, the main strategic challenges and the Cultural Statement, prioritized as follows:

Financial Competitiveness
(45%)

Energy Transition
(30%)

TESG (Adaptation)
(15%)

Life First – HSE
(10%)

The energy transition front included objectives related to aggregate CO₂e emissions reduction of the Ecopetrol Group (CO₂, CH₄, N₂O).

In 2021, Ecopetrol reduced
293,594
tonnes of CO₂e,

exceeding the target for the year by 25% (see section on Metrics and Targets of this Report for more details on the emission reduction metrics employed).

The Ecopetrol Group's BSC linked to climate change and energy transition targets is shown below (see Table 1 and Table 2):

Table 01.
2021 BSC Ecopetrol Group

Objective	Indicator/Milestone	Weight	Unit	2021 Target	Target achieved	Compliance percentage
Energy transition and innovation	Gas: • Execution of gas strategy	10%	%	100	65	65%
	Diversification:					
	• Renewable energy ¹	10%	MW	158	178	114.1%
	• Diversification options		%	100	97	97%
	Climate change and water:	5%				
	• Cumulative GHG reductions		tCO ₂ e	235,263	293,594	125%
	• Execution of resources associated with NCS (\$)		%	100	90	90%
Adaptation	• Water reuse		%	100	119.4	119.4%
	Innovation and technology value-added	5%	MUSD	226.8	347.42	153.1%
	TESG strategy	5%	%	100	99	99%

Table 02.
2022 Performance Contract

Focus	Indicator/Milestone	Weight	Unit
Energy transition: Diversify into Low Emissions Businesses	Grow in gas and renewable energies	5%	%
	Ensure ISA value promise: EBITDA	10%	T COP
TESG	Decarbonize operations: GHG reduction	10%	tCO ₂ e
Cutting-edge Knowledge	Accelerate energy transition with science, technology and innovation	5%	%

To find greater alignment with the 2040 Strategy as well as among the Group's businesses and areas, Ecopetrol implemented changes in the 2022 BSC in order to: (i) achieve greater alignment by establishing a single BSC for the Group, eliminating scorecards by areas; (ii) simplify the number of objectives and metrics to focus on the most relevant issues of the 2022-2024 strategy and business plan; and (iii) place a greater weight (%)

on indicators related to the objective of growing with the energy transition, and decarbonization, increasing from 5 to 10% the weight of the GHG reduction indicator. Instead of the BSCs by areas, Ecopetrol migrated to "Performance Contracts" that will reflect each area's contribution to the critical objectives established in the BSC for the execution of the "Energy that Transforms" strategy and the 2022- 2024 Business Plan.

1. Measured based on the actual MW equivalent incorporated into the matrix (112.8 MW at the end of 2021), including those under construction at the end of the year (66 MW), from Non-Conventional Renewable Energy Sources NCREs, for a total of 178 MW.

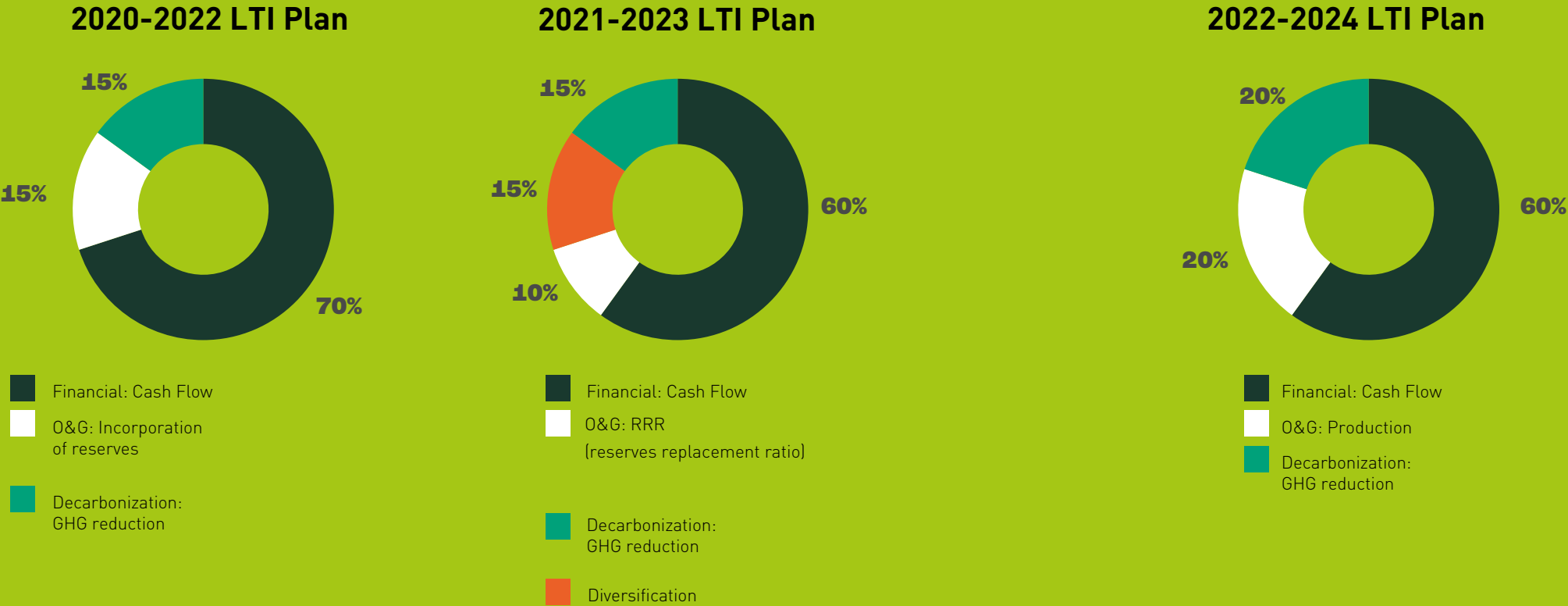
(ii) Long-Term Incentives (LTI): Long-Term Incentives are associated with the achievement of strategic objectives that guarantee the Company’s sustainability and encourage cohesiveness among the management team. The LTIs are part of the remuneration structure for the CEO/Presidents, Vice Presidents and equivalent roles according to their level of responsibility and measured under performance criteria. In 2021, LTI applied to 1.4% of the Group’s employees.

LTI plans are valid for three (3) years, although each year a new version of the plan is launched with objectives aligned with the 2040 strategy.

It should be noted that all three (3) current plans include a GHG reduction goal in line with the target of net zero carbon emissions by 2050. The strategic goals of the plans are presented below, which are categorized into three main themes: (i) financial competitiveness; (ii) production and reserves, and (iii) decarbonization of operations and diversification into low-emission businesses (see Figure 4).



Figure 04.
Long-Term Incentive Plan (LTI)



LTI PLANS ARE VALID FOR THREE (3) YEARS, ALTHOUGH EACH YEAR A NEW VERSION OF THE PLAN IS LAUNCHED WITH OBJECTIVES ALIGNED WITH THE 2040 STRATEGY.

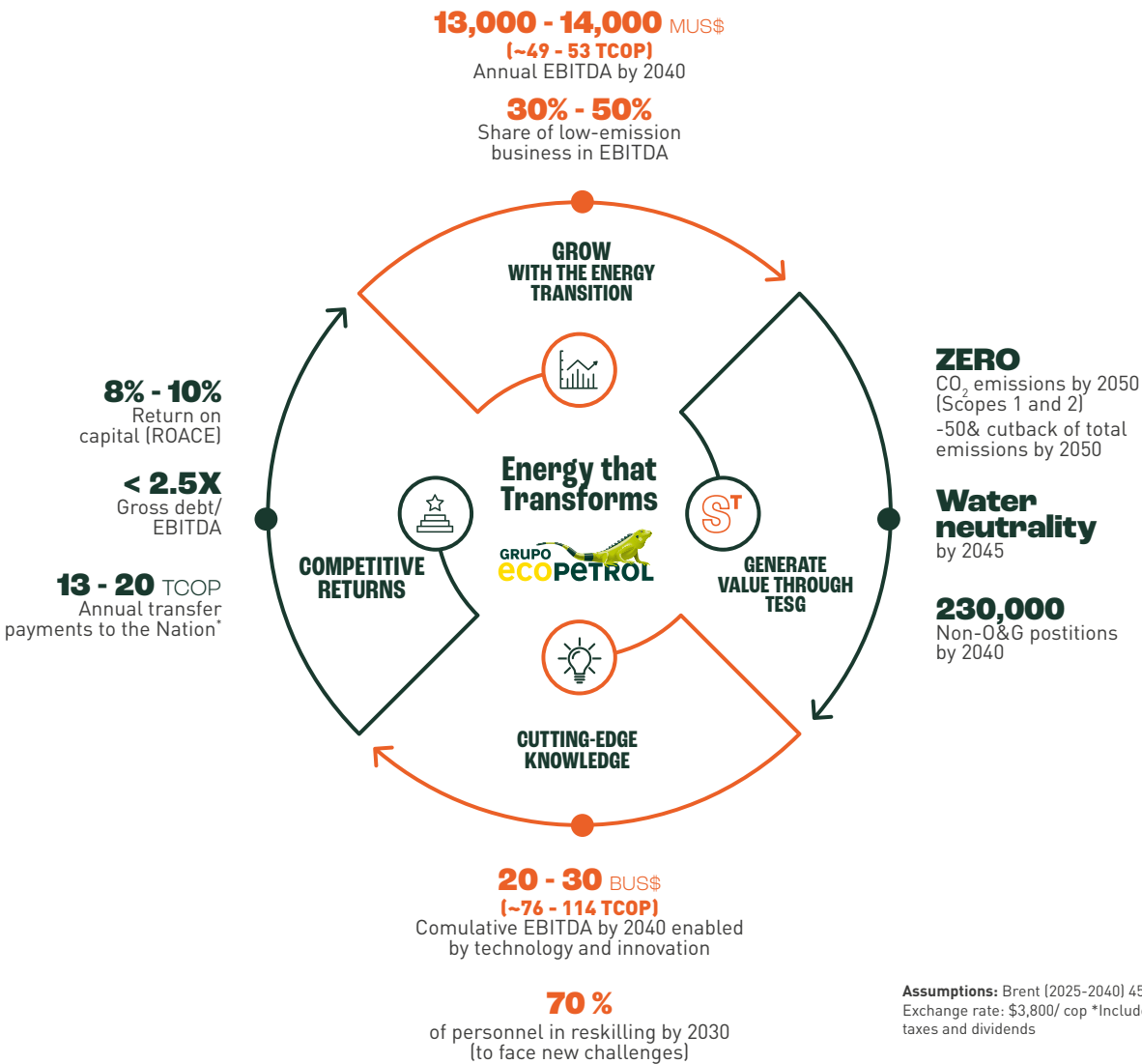
02 STRATEGY

The 2040 strategy of the Ecopetrol Group, called “Energy that Transforms”, fully addresses current technological, environmental, social, and governance challenges, maintaining its focus on generating sustainable value for all its stakeholders.

Its objective is to consolidate an agile and dynamic organization that promptly adapts to the changes being faced by the energy industry, the challenges of a world advancing in the generation and use of clean energy, moving ahead towards growth opportunities and leadership in the American continent.

The 2040 Strategy defined four (4) pillars: (i) grow with the energy transition; (ii) generate value through TEGS; (iii) cutting-edge knowledge; and (iv) competitive returns (see Figure 5).

Figure 05.
Evolution of the Ecopetrol Group Strategy



The 2040 strategy seeks to advance the decarbonization objectives, maintaining the focus on competitiveness and leveraging technology as an enabler.

By implementing this strategy, the Ecopetrol Group seeks to contribute to Colombia's energy security and economic development, oriented towards a gradual energy transition. Among the aspects considered for this transition, the following stand out:

1

Continue strengthening the competitiveness of the oil and gas business: Ecopetrol seeks to guarantee the capture of value of the current portfolio, as well as resilience to the various energy transition scenarios and greater price volatility in order to maintain competitive returns that positively impact Colombia's economic development.



2

Diversify Ecopetrol's portfolio in energy and low-emission businesses, which consider the following three dimensions:

Diversification of the traditional business includes goals related to the diversification of the hydrocarbon business line, which includes the Upstream (oil and gas exploration and production), Midstream, and Downstream (refining and petrochemicals) segments.

Diversification in the electricity and infrastructure market: the strategic objective seeks to materialize the value of ISA and boost its growth, mainly in the acceleration of its portfolio and new geographies growth.

Diversification into sustainable businesses: three alternatives are currently being analyzed: Natural Climate Solutions (NCS), Carbon Capture Usage & Storage (CCUS) and Hydrogen (H2). The priority is to focus on the maturation of these three emerging businesses.

Regarding the hydrogen development, in 2021 Ecopetrol launched the Low Carbon "Hydrogen Strategic Plan, aligned with the Colombia's Hydrogen Roadmap, which will contribute between 9% and 11% of the 50% scope 1, 2 and 3 emissions reduction by 2050 goal.



3

Achievement of decarbonization targets leveraged on TSEG strategy: Accelerate and prioritize energy efficiency and the reduction of GHG emissions through the following actions: a) constant updating and continuous verification of the GHG inventory; b) identification, development and implementation of initiatives to reduce emissions in operations through energy efficiency, renewable energies and reduction of flaring, fugitive emissions, and venting; c) advance in the development of emerging technologies by implementing green and blue hydrogen pilots, and CCUS, and d) develop and consolidate a NCS offset portfolio (more information is provided in the Metrics and Targets in section 4 of this document).

For more information on decarbonization targets, please see the Metrics and Targets in section 4 of this document.



On March 25, 2021, the Ecopetrol Group announced its commitment to reach net-zero carbon emissions by 2050 (scopes 1 and 2), and to reduce 25% its CO2 emissions by 2030 versus those of 2019 (scopes 1 and 2). Additionally, it has established the goal of reducing by 50% its total emissions by 2050 (scopes 1, 2 and 3). Moreover, in 2021, Ecopetrol Group subsidiaries in the Midstream segment - CENIT, ODL and Bicentenario - received the Carbon Neutrality certification based on the Colombian Institute for Technical Standards guidelines (ICONTEC for its Spanish acronym). This process included the structuring of an emissions reduction and compensation plan, which included the acquisition of carbon credits from a REDD+ project in the Colombian Pacific. By 2022, the entire Midstream segment is expected to be Carbon Neutral certified. Similarly, the first shipment of one million barrels of Castilla Blend® offset carbon was sold to Petrochina, with the acquisition of 32,000 carbon credits from a Colombian hydroelectric project carried out under the *Verified Carbon Standard* (VCS) certification program.

Progress in the GHG compensation portfolio continues, which is based on the implementation of NCS projects. Additionally, progress was achieved in the structuring of carbon quantification methodologies for strategic ecosystems (See the section on Opportunities in this document for more information on the NCS projects).



Capital allocation and investment criteria in TESG-focused initiatives and projects

In 2021, the Ecopetrol Group (excluding ISA) executed approximately USD 95 million in investments in TESG-related projects. These were mainly concentrated in the Piedemonte, Llanos Orientales and Upper Magdalena basins. Investments were also allocated in the Upstream and Midstream businesses, in projects related to decarbonization, energy efficiency, optimization of energy sources, and exploitation and use of gas in operations, as well as in studies carried out by the Center for Innovation and Technology (ICP for its Spanish acronym).



2022-2024 Business Plan

In line with the 2040 Strategy and the TESG objectives, the 2022 - 2024 Business Plan (excluding ISA) foresees investments for approximately USD 1,400 million in projects that adhere to the aforementioned guidelines. Likewise, approximately USD 2,000 million will be invested in low-emission projects primarily associated with energy transmission.

investments in the development of renewable energy sources for self-generation, studies for the development of CCUS projects, optimization of energy use in operations, and investments for the use of gas in operations stand out. Approximately 88% of these investments will be made in assets located in the departments of Meta, Casanare, Santander and Bolívar, mainly in the Upstream segment, and in the Barrancabermeja and Cartagena refineries.

As to the development of new energy sources, expected investments include green hydrogen projects in the Barrancabermeja and Cartagena refineries, as well as studies for hydrogen production that will be carried out in the Innovation and Technology Center (ICP). The Ecopetrol Group will make average annual investments of close to USD 140 million by 2040 for the production of green, blue and white hydrogen (more information on hydrogen projects is provided in the *Opportunities* section of this Report).

THE PLAN INCLUDES INVESTMENTS FOR USD 697 MILLION IN INITIATIVES FOCUSED ON WATER MANAGEMENT, TREATMENT AND USABILITY OF WATER IN OPERATIONS.

Investment Criteria for TESG and Energy Transition Projects

The Ecopetrol Group aims to execute annual investments totaling over USD 250 million in decarbonization projects, energy efficiency, fuel quality, and comprehensive water management and hydrogen to strengthen the action lines associated with the energy transition.

The capital discipline guidelines establish that:

- I. The emissions volume during the useful life of all projects and their mitigation plans must be reported.
- II. Financial valuations of business cases and optimizations should include the economic impact of CO₂e emissions.



In 2021, the **internal carbon pricing** was launched as a complementary methodology to assess the impact of GHG emissions in economic valuations. In 2022, the Internal Carbon Price is approved as a mandatory variable and is established as a base scenario in the financial assessment for current and future investment decision-making. This scenario considers the impact of scopes 1 and 2 GHG emissions in the Net Present Value (NPV) and the mitigation alternatives.

The Company annually reviews its Internal Carbon Price, which has been defined at **20/tCO₂e for 2022, USD 30/tCO₂e as of 2025 and USD 40/tCO₂e as of 2030**. The following variables were considered to define the internal price:

- (i) current levels of CO₂ prices, which on average exceed USD 20/ton CO₂e based on the historical IHS Markit price;
- (ii) long-term price expectations assuming an increase to USD 39/tCO₂e in 2030 according to the IEA (International Energy Agency) reference price;
- (iii) Oil & Gas industry benchmarks with observed price ranges between USD 20/ton and USD 60/ton, and
- (iv) assessment of the impact on the investment portfolio at different price levels considering the intensity of emissions applied to the financial valuation of future projects.

Aligned with the Company's Decarbonization Plan, the Internal Carbon Price leverage the achievement of the emission reduction targets and manage the climate change-related risks to which the industry is exposed. It is important to note that, according to the mitigation hierarchy, this assessment process does not consider the use of carbon offsets or credits, to guarantee that all efforts are made to reduce operational emissions.

2.1 Climate-related risks and opportunities

The Ecopetrol Group continues strengthening the process to identify, evaluate and manage climate-related risks and opportunities. For this, the following time frames and actions have been established for each time horizon:



Short-term (0-3 years):

- (i) set and achieve the annual GHG emission reductions and interim targets, in line with the Decarbonization Plan;
- (ii) update the scenario analysis for physical and transition risks and define time horizons in which the identified opportunities and risks may materialize;
- (iii) determine mitigation actions, controls and Key Risk Indicators (KRI) within the framework of the annual risk management cycle; and
- (iv) identify and apply cost-effective opportunities that contribute to attaining the GHG emissions reduction objectives.



Medium-term (4-10 years):

review the GHG emissions reduction and compensation objectives by 2030, following the Company's Decarbonization Plan. Identify emerging risks that will impact the Company in the next five (5) years.



Long-term (> 10 years):

review market trends, changes in policies and regulations, and the development of emerging technologies that may impact the Company's climate ambition and the 2040 long-term Strategy.

Currently, Ecopetrol has identified the climate-related physical and transition risks as well as the opportunities at a Group level, and is working on classifying these risks in the different operating segments and time horizons according to the scenario updates mentioned above:



Physical risks

Physical risks concern the Company's exposure and vulnerability to the impacts of climate variability and climate change in Colombia, which could affect the availability of water and increase the exposure of assets and operations to potential damage.

For the Ecopetrol Group, risks classified as acute are those caused by extreme climatic events whose frequency and intensity have been increasing due to the gradual increase in global temperature. In Colombia this is reflected in the occurrence of the climatic variability phenomenon "El Niño" and its opposite weather pattern *La Niña*, emphasizing that the occurrence of these phenomena does not suppress seasonality; i.e. *El Niño* does not nullify the rainy seasons, nor does *La Niña* reverse the dry or less rainy seasons. The resulting conditions are, among others, water shortages, floods, fires, storms, hurricanes and sea level rise. Extreme weather events could

cause damage to assets, negatively affecting the Company's operations and financial condition.

On the other hand, the risks classified as chronic are those that result from medium and long-term changes in climate conditions, including sea level rise or changes in the level and frequency of precipitation which directly affect the Company's operations. Therefore, the acute risks associated with climate variability events are the most relevant, and as such short-term financial and strategic impacts are considered.

(See section 2.2. Impact of climate-related opportunities and risks on the Company's business, strategy and financial planning, in this Report).





Transition Risks

Transition risks pose an additional challenge for the Company, and its financial valuation, to determine the impact on the business strategy and to establish a resilience plan to be sustainable over time. During 2022 and 2023, the Ecopetrol Group will analyze the financial and strategic impact of the transition risks based on globally recognized scenarios to strengthen the Company's strategy to face the challenges of climate change throughout its value chain.

The transition-related risks that have been identified and are managed by the Group are detailed below:

Regulatory risk

The regulatory scenario related to energy transition involves regulatory changes that may directly affect the Company in the short and medium term. Currently in Colombia, the climate-related regulatory framework is not binding for the business sector, including the Ecopetrol Group. However, the Company is committed to significantly contributing to national and sector goals, which in the future may be reflected in potential mandatory requirements.

At local level, the regulatory changes, which may have a financial or strategic impact on the Company, are highlighted:

- Unavailability of information associated with climate change mitigation and adaptation that limits the response to the requirements for the application or modification of current and future licenses.
- New regulations regarding the detection and repair of leaks, the use of natural gas, flaring and venting of natural gas during hydrocarbon exploration and production activities.
- Modifications to carbon tax regulation.
- In December 2021, the Financial Superintendence of Colombia issued instructions to the Legal Representatives and Fiscal Auditors of Issuers on the disclosure of information about social and environmental matters, including climate issues, with the purpose to standardize and improve the relevance of information on sustainability practices for investors and strengthen its disclosure by issuers from a financial materiality perspective.
- New requirements to validate and verify GHG reduction projects and their registration in the National Registry of GHG Emission Reductions (RENARE).

In relation to **emerging regulatory changes**, the following have been identified at a **local level**:

- Implementation of the National Emissions Trading System (PNCTE), which would assign emission rights. This program is in the design and development phase of the regulatory framework and its enactment is expected in 2025 with full enforceability by 2030. Adherence of the Company to the program would have a significant financial impact, and would consequently be necessary to realign the Company's current climate ambition.
- Possible restrictions on the voluntary compensation of GHG emissions in exploration, production and refining activities to encourage and accelerate reduction actions in the company's value chain.
- Update of Article 21 of Law 1819 of 2016 associated with charges and fossil fuels taxed with the carbon tax.
- New requirements that increase the probability of restrictions for Unconventional Reservoirs projects and greater environmental requirements for production and exploration projects in progress.

At the **international level**, the regulations proposed by the U.S. Securities and Exchange Commission (SEC) for publicly listed companies to disclose information about their financial exposure to climate-related risk and their strategies to address them in their registration statements and periodic reports.



Legal risk

Negative reactions and lawsuits against the climate action of the Ecopetrol Group may potentially affect the Company’s operations and financial condition. However, the Group has a structure that allows for ongoing relations with its stakeholders, which allows it to address requirements promptly. Likewise, issues related to climate change are publicly disclosed on the website, in the Integrated Sustainable Management Report and in this Report, which are publicly available.



Risk of stranded assets

Under its energy transition scenarios, the Ecopetrol Group has developed a strategy aimed at identifying stranded assets in its traditional business of production, midstream and downstream. Based on fuel demand projections, a risk of stranded assets have been identified, for which a methodology has been proposed that allows, in the case of the Upstream segment, to measure market factors, sustainability and technical capacity for the assets. It consists of weighing the following factors:

- (i) Break-even price at which the asset maintains its expected return;
- (ii) Payback period, and
- (iii) Certainty in the development of the project, considering the environment and technical capacity. As a result of the analysis, segment mitigation plans are being implemented for assets identified as stranded assets risk.

Regarding the Midstream and Downstream segments, the defined methodology measures the risk of stranded assets in terms of the number of years the asset is capable of generating financial returns for the Company - a greater number of years suggests a lower risk. This methodology will be applied each year, considering market factors and asset-specific factors that could make them more prone to becoming stranded.



Market risk

The energy transition is driving the market towards a long-term preference for low-carbon products, which may imply a risk for the Ecopetrol Group of not meeting market demand and not moving rapidly towards the development of these products. Therefore, the Company constantly monitors and analyzes market development, trends and behavior, O&G and downstream best practices, as well as the use of low-carbon products and energy use for electrification. To manage market risk, Ecopetrol has made progressed on the following fronts:

Upstream: Management of Scope 1 & 2 GHG emissions through the implementation of reduction initiatives in production processes (process optimization, operational control and energy efficiency). Likewise, the partial compensation of GHG emissions is carried out through the acquisition of carbon credits.

Biodiesel: for over a decade the Ecopetrol Group has been working in biofuels based on palm oil through the production of biodiesel through its subsidiary Ecodiesel, with a production of around 125 KTA that meets Colombian regulatory standards, as well as conducting research and development on other organic raw materials.

Clean fuels: in relation to improving the quality of fuels supplied by Ecopetrol, since April 2018, the sulphur content in B2 diesel (98% fossil and 2% biodiesel) has been significantly reduced. In 2021, diesel and gasoline distributed in Colombia averaged 13.3 ppm and 60.4 ppm sulphur, respectively, below the current local regulations of 20 ppm for diesel and 100 ppm for gasoline. The Barrancabermeja and Cartagena refineries made adjustments to their operating schemes to implement the new regulation, which limits the sulphur content to a maximum of 50 ppm in regular gasoline from 2022.

Biofuels: As of 2021, with the support of the Center for Innovation and Technology of Ecopetrol, the Downstream segment has begun to assess and perform pilots for the production of *Sustainable Aviation Fuel* (SAF) and *Hydrotreated Vegetable Oil* (HVO) also known as renewable diesel. This biofuel is produced from vegetable and animal oils and fats. In 2022, the Company expects to conduct an industrial trial in order to evaluate the production of HVO, while in parallel assessing the possibility of modifying an existing plant in the Barrancabermeja Refinery for the continuous production of SAF and HVO. These assessments will provide estimates of the necessary investments and estimated timeframes for this line of business.

Low-emission solutions: Integrates the areas of gas, biogas, LPG, energy, renewables, hydrogen and CCUS. (See the section entitled *Impact of climate-related opportunities and risks on the organization’s business, strategy and financial planning*).



Reputational risk

For the Ecopetrol Group, a reputational risk stems from the impossibility of responding promptly to pressure from investors and other stakeholders to establish ambitious goals on climate change, which could substantially affect the Company’s image and brand. For this reason, a constant benchmarking is carried out against the performance of its peers, to challenge the Company’s climate strategy and endorse an ambition in line with the Paris Agreement objectives and the global Oil & Gas industry initiatives

(More information on climate change related risks can be found in the **20-F Annual Report, Risk Factors** section, pp. 140-171).



Technology risk

The path to the energy transition depends on successfully selecting, developing and deploying new technologies and the capabilities needed to operate, maintain and improve those technologies. In this context, the Company may see its profitability affected if it fails to prepare and cannot adapt.

Climate- related opportunities

The Ecopetrol Group monitors and evaluates the energy market and business environment, as part of its process of identifying, assessing and responding to climate-related opportunities. Based on that, The Group updates its Energy Transition Scenarios and action lines are defined that include opportunities and implications for the Company and a roadmap for an in-depth analysis of the opportunities, as described below:

- (i) The Ecopetrol Group’s Energy Transition Scenarios are updated based on current global and local trends (see section 2.3 Scenario Analysis).
- (ii) The Ecopetrol Group identifies and analyzes the trends in the updated scenarios for the short, medium and long term, and identifies a set of potential opportunities.
- (iii) The Ecopetrol Group estimates the size of the market or opportunity, establishing the competencies or competitive position to develop a business case to assess its viability.
- (iv) Finally, the roadmap is built to develop feasible opportunities.

The Ecopetrol Group identified different opportunities related to energy supply, resource efficiency, development of new products and services, access to new markets and build-up of the Company's general resilience vis-a-vis the energy transition. The opportunities identified are presented in greater detail below:

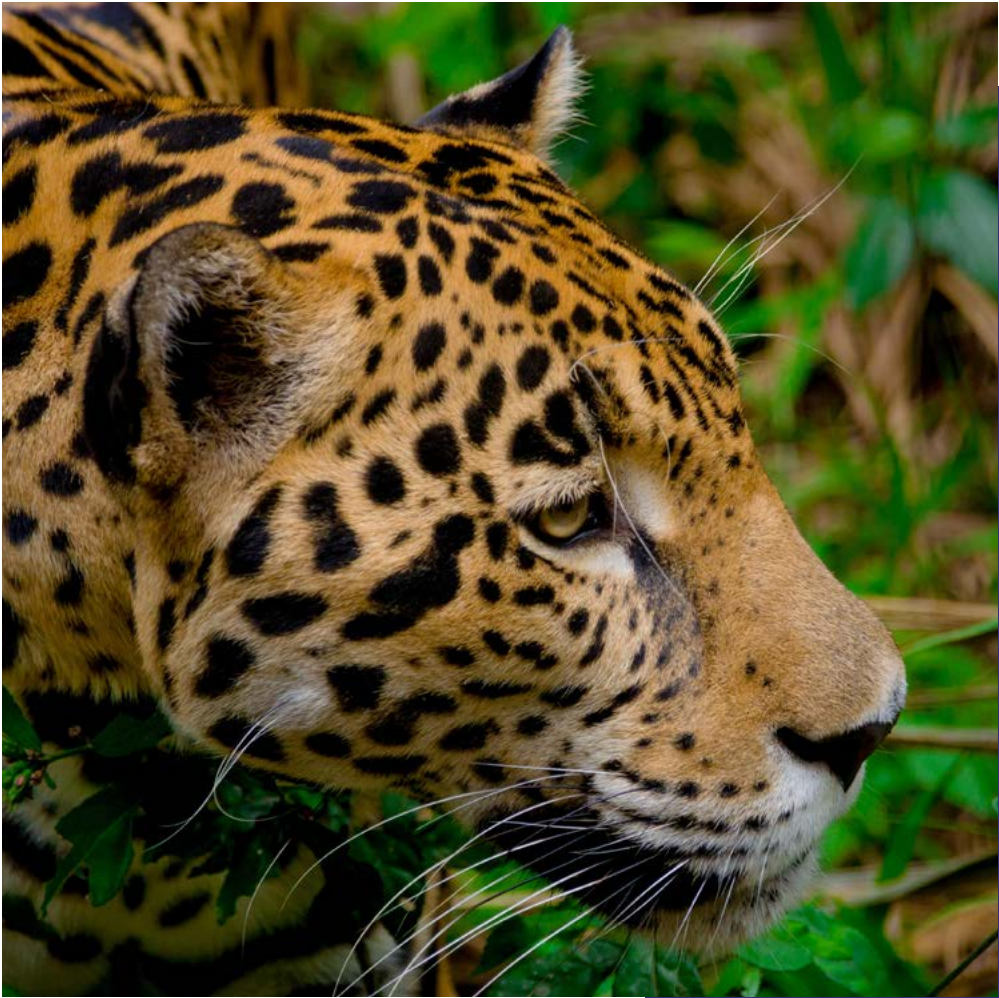
Diversification of core business

Diversification within the oil and gas value chain includes low-carbon energy logistics and transportation opportunities, and petrochemicals. As part of the energy transition, the Ecopetrol Group has identified opportunities to make resilient its core business by taking advantage of the gas outlook as a transition fuel, the need of logistics and transport for other type of fuels and energetics and growing demand for more sustainable petrochemicals. All the segments of the company (upstream, midstream and downstream) are assessing business cases to expand the participation of these opportunities in their portfolio.

Diversification in sustainable businesses

The demand for low-emissions solutions and services is expected to increase in the coming decades, therefore the Group will focus its future assessments on the following opportunities: hydrogen, CCUS and NCS.

As for the hydrogen perspective, which is currently the most feasible, it has a roadmap that includes three horizons. The first, 2022-2030, focuses on intensifying the use of hydrogen within its own operations through industrial-scale projects and beginning to implement applications in sustainable mobility. The second, 2030-2040, contemplates opportunities by expanding the hydrogen business to maritime and air mobility and seeks to capture and achieve significant results in the decarbonization of operations. Finally, in the third horizon from 2040 onwards, the Company focuses on promoting the widespread adoption of hydrogen. This will



be possible through alliances with the French companies Total Eren and EDF, the German company Siemens, the Spanish company H2B2, and the companies Empati from the United Kingdom and Mitsui from Japan.

Regarding NCS, the Ecopetrol Group prioritized those with the greatest potential in the country in terms of carbon sequestration and complimentary benefits for ecosystems and local communities: (i) avoided deforestation projects or REDD+; (ii) restoration of natural forest, and (iii) tree planting on agricultural land (silvopasture and agroforestry). The Company defined a portfolio that includes the development of actions to enable carbon supply, which also includes the development of methodologies, protocols, baselines and anticipated investment primarily for forest carbon projects. In 2021, the launch of the portfolio began through the following alliances:



Wildlife Conservation Society (WCS) – *Proyecto Vida Silvestre* (PVS for its Spanish acronym): is a wildlife-focused initiative that seeks the long-term conservation of biodiversity in environments where the Company operates through the implementation of actions to protect threatened species and generate benefits for human communities.



ISA – REDD+ *Valle del Magdalena Medio* (in Mid Magdalena) is a project that aims to actively contribute to the conservation and ecological connectivity of the Ciénaga de Barbacoas Integrated Management District. Its main objective is to prevent deforestation, through the restoration, enrichment and conversion of pastures to agroforestry and silvopasture systems.



The Nature Conservancy – Water, Climate and Compensation initiative that seeks to design, develop and promote mechanisms that contribute to water security, climate change mitigation and adaptation and defining actions and strategic areas for the conservation of biodiversity.



Fundación Natura – *CO Humedales*: is a project that seeks to conserve and restore tropical forest ecosystems at the national level, and freshwater wetlands in Mid Magdalena and Lower Magdalena, as well as formulate and implement actions to mitigate GHG emissions generated by the degradation of these ecosystems.



Carbon Monitoring: project that seeks to develop a carbon monitoring protocol for restoration projects and strengthen the enabling conditions for its implementation, based on tree planting data from the Departments of Meta and Caquetá.



ISA – *Conexión Jaguar* seeks to combine efforts focused on GHG mitigation and biodiversity conservation and provide benefits for communities.



South Pole – Natural Climate Solutions Portfolio: this alliance seeks the consolidation and sustainability of the portfolio through the identification, evaluation, implementation and endorsement of initiatives with emission reduction potential - mainly in the forestry sector- which contribute to supporting carbon supply for the Company's compensation needs.

For further information about the projects and alliances, please review our website section **Biodiversity -Strategic Alliances**.



Diversification in the electricity market and infrastructure

Given the trend of increasing electrification in the energy matrix, diversification of the electric power business was identified, which includes the expansion of the Group into the electricity value chain in Colombia and the region, generation of power for its own operations and transmission. The acquisition of ISA represents an important step in diversifying the Company's portfolio.



Energy efficiency

The Company has an energy efficiency program through the execution of projects and initiatives in the hydrocarbon business line that would lead to a reduction in energy consumption, and consequently, a decrease in GHG emissions as part of the objectives of the decarbonization program and operational savings from the reduced consumption.

To achieve these goals, the energy efficiency program's initiatives are grouped into three (3) categories:

- (i) **Operational control:** consists of the implementation of operation and maintenance best practices in the productive processes of the three (3) business segments. This is ensured through the management of energy performance according to the guidelines of the ISO 50001 international standard.
- (ii) **Technological improvement:** development and implementation of investment initiatives in the different business segments of the Ecopetrol Group which have a significant impact on assets' power consumption without affecting their productive level.

(iii) **Improvement of the Energy Intensity Index (EII):** combines the implementation of operational and technological measures that have an impact on energy consumption and that are quantified through the (EII), according to the Solomon methodology.

In 2021, the application and monitoring of energy efficiency initiatives generated benefits worth

USD 7.1
million

which is equivalent to the optimization of 5 MW and 2,278 GBTU and the reduction of 133,159 tCO₂e. These results were achieved through the implementation of initiatives such as operational control in Piedemonte and Cartagena Refinery treatment facilities, as well as the development of technological improvements such as the implementation of PMM engines in the Rubiales Field.

For more information, refer to **the Integrated Sustainable Management Report 2021**, *Environment* chapter section *Use of Energy and Alternative Sources* pp. 226-237.



Renewable energy

In 2021, the Ecopetrol Group ratified its target of incorporating between 400 - 450 MWp by 2024 from non-conventional renewable energy sources into its electricity generation network for its own consumption, seeking to increase the share of these sources from 5% in 2019 to 21% in 2024. As of 2021, 112.8 MWp were operational (Castilla solar eco-park 21 MW, San Fernando solar eco-park 61 MW, small eco-parks Cenit 0.5 MW, Esentia roof panels 0.3 MW, and 30 MW of energy purchased from the October 2019 long-term auction).

By the end of 2022, there will be an additional 129 MW of renewable energy incorporated into the supply matrix of the Ecopetrol Group, reaching a total of 242 MW. Additionally, the entry into operation of 26.3 MW from solar energy is foreseen in Huila, 23 MW from solar energy in different pumping plants of the national pipeline

system and 2.2 MW of hydraulic energy recovery from the pipeline system at the Vasconia station. The incorporation of the first small hydroelectric power plant (PCH) Cantayús for 4.3 MW located in the Department of Antioquia stands out. Additionally, it is expected that by the end of 2022 the construction of the La Cira (56 MW), Rubiales (87 MW) and Quifa (50 MW) solar photovoltaic initiatives will have begun.

DURING 2022, A REDUCTION OF 4,281 TONS OF CO₂e WAS ACHIEVED, ALONG WITH OPERATIONAL SAVINGS OF COP 2.610 BILLION THROUGH THE SOLAR ECO-PARKS CASTILLA SAN FERNANDO AND CENIT.

2.2 Impact of climate-related opportunities and risks on the Company's business, strategy and financial planning

The Company is aware of the challenges of quantifying the financial and strategic impacts of the aforementioned risks and opportunities, and how these are reflected in the Company's strategy and financial planning in the short, medium and long-term. Therefore, the Ecopetrol Group has made progress in the analysis of the most relevant opportunities and risks and their probability of occurrence. This does not imply the absence of future analyses of

other climate-related risks and opportunities, considering that this exercise requires the availability of information and climate change scenario analysis.

An indicative estimate of the financial benefits of the Company's prioritized climate-related opportunities aligned with the 2040 Strategy is presented below (see Table 3).

Table 03. Main financial benefits of the climate-related opportunities

Opportunity category	Description	Probability	Magnitude of impact	Estimated EBITDA contribution of the EG in 2040
Products and services	Take advantage of gas outlook as a transition fuel, the need for logistics and transportation for other fuels and energies, and the growing demand for lower-emission petrochemical.	Very probable	Medium	Between USD 1,000 and 1,800 million
Products and services	Development of low carbon hydrogen projects (blue, green, white).	Very probable	Medium	Between USD 300 and 500 million
Products and services	Development of CCUS projects.	Probable	Medium	Between USD 1,000 and 1,500 million
Products and services	Implementation of NCS projects	Probable	Medium - Low	Between USD 200 and 250 million
Access to new markets	Transmission and toll roads business (ISA)	Very probable	Medium	Between USD 3,000 and 4,000 million

Note: Indicative figures

The following table presents the prioritized climate-related business risks (see Table 4), which are derived from the analysis of the Risk Assessment Matrix (RAM) economic dimension, which considers a range between medium and very high (USD 10 million to USD 150 million).

Table 04. Main estimated financial impacts of the prioritized climate-related risks

Risk category	Description	Probability	Magnitude of impact	Estimated financial impact*
Acute physical risk	Climate variability phenomena have the greatest impact on Ecopetrol's infrastructure and operations. The "El Niño" phenomenon is characterized by: (i) lack of rainfall, which can drastically decrease the flows of surface water bodies, affecting both the use of fresh water and wastewater discharges due to the reduction in the dilution potential of the bodies receiving the water; (ii) increased temperatures, which causes heat waves and could have a direct impact on the health of our workers and cause an increase in epidemics and diseases; and, (iii) the potential negative impact on energy supply due to the decrease in the level of the rivers that feed the country's hydroelectric generation system.	Very probable	High in the economic dimension	>USD 50 million (in a three-year period)
Emerging regulatory risk	Increase in the Mines and Energy sector's emission reduction ambitions, above its current 29% contribution to 51% of Colombia's NDC by 2030, which would result in additional pressure for the Ecopetrol Group to increase its target by the same proportion, which would amount to an additional 2.4 MtCO ₂ e by 2030.	Low probability	High on the economic dimension	>USD 90 million (by 2030)
Technological risk	Failure to achieve competitiveness and resilience of the Oil & Gas business and the Company's assets concerning the energy transition in terms of costs, production and commercialization of hydrocarbons and profitable products, which comply with regulations and market requirements, due to limited access to technology.	Very low probability	Ver high on the economic dimension	Between USD 350 and \$400 million (in a three-year period)

*Information estimated at July 31, 2022. Indicative figures.

2.3 Scenario analysis

Since 2018, Ecopetrol has been conducting energy transition scenario analysis as part of its strategic process. This exercise allows to define actions to manage the opportunities and risks that the transition to a low-carbon economy entails and adapt the business strategy to ensure long-term value creation.

The Company considered two (2) scenarios and two (2) sensitivities for its energy transition analysis for both global and local perspectives (for more information on the assumptions and sensibilities of these scenarios, please refer to the **2020 TCFD Report.**)

Based on these scenarios, the Company updated its long-term outlook, as reflected in its 2040 Strategy, through which it seeks to grow with the energy transition, meet decarbonization goals and use technology as a TESG driver, seeking a balance between its commitment to mitigating climate change and its contribution to the socioeconomic development of the country, in its role as a state-owned company.

In 2019, the Ecopetrol Group conducted a physical risk analysis that included a Representative Concentration Pathways (RCP) 6.0 scenario under

the Comprehensive Climate Change Management Plan for the Energy and Mining Sector (PIGCCme for its Spanish acronym) and the Third National Communication on Climate Change (TCNCC for its Spanish acronym). This baseline scenario is based on the period spanning between 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 four (4) RCPs are similar, the country developed a multi-model ensemble to generate future climate scenarios in different time windows. According to the model's results, Colombia's average temperatures between 2011 and 2040 are expected to increase by approximately 1.0o C for the four (4) RCPs. The periods between 2041 and 2070 and 2071-2100 were not considered for this analysis because of the aforementioned.

The analysis of acute and chronic physical risks considered the areas in which the Company has current and future operations and the most probable threats, in a range from extreme to mild, and reported the following results (see Figure 6 and Figure 7).



Table 06. Climate variability scenarios by 2040

































































	"El Niño" phenomenon		"La Niña" phenomenon	
				
REGION	Water shortages	Fires	Floods	Mass movements
Caribbean				
Catatumbo				
Central				
Eastern				
Orinoquia				
South				
Risk Level	 Slight	 Moderate	 High	 Extreme

Table 07. Climate change scenarios by 2040

	"El Niño" phenomenon		"La Niña" phenomenon	
				
REGION	Water shortages	Fires	Floods	Mass movements
Caribbean				
Catatumbo				
Central				
Eastern				
Orinoquia				
South				
Risk Level	 Slight	 Moderate	 High	 Extreme

Based on the above, the Company formulated adaptation plans at the regional level, which incorporate measures associated with water management, strategic ecosystems, resilient infrastructure and climate-compatible operations. However, it recognizes the importance of expanding its physical risk analysis to include lower emissions concentration trajectories and horizons beyond 2040, in order to determine the exposure of assets to more restrictive scenarios and establish short, medium and long-term actions, based on the strategic and financial impact for the Company. This process will be conducted during the second half of 2022 and 2023.

For further information, please refer to the **Vulnerability and adaptation and climate change** section on our website.



03 RISK MANAGEMENT

As it has been described in the sections above, Ecopetrol has implemented actions, strategies and roadmaps to strengthen and advance in the integration of climate-related management into its business plan. These guidelines have been designed by the Board of Directors, the Board of Director's Audit and Risk Committee and Senior Management (section 1.1 and 1.2), resulting in a fundamental change in how climate-related risks and opportunities are approached by the Company. The evolution was seen mainly in climate topics being merely environmental, to becoming a crosscutting theme included in the business plan and the corporate strategy.

In terms of risk management, the Company has been reviewing and updating the Business

Risk Map, which incorporates issues relating to climate change management, water management and energy transition. These are part of the set of risks managed by the Company's Integrated Risk Management System (SRI for its Spanish acronym). Furthermore, the Company continues to conduct exercises to identify climate-related risks and opportunities, their impacts and benefits (Sections 2.1 and 2.2)

For more information on the Integrated Sustainable Management Report please refer to the **Integrated Sustainable Management Report 2021**, Chapter 6 on *Governance* pp. 166-173.



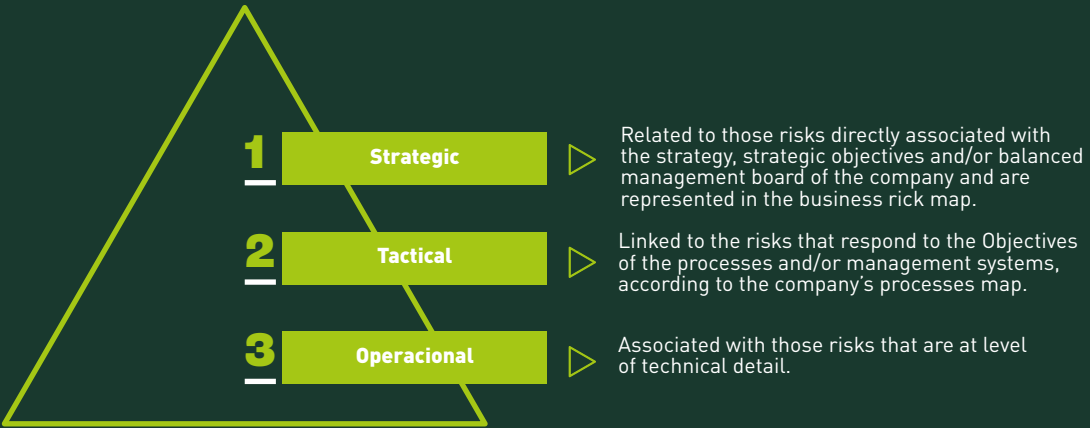
3.1 Integrated Risk Management System

The process of identifying, assessing and responding to climate-related risks is part of Ecopetrol's Integrated Risk Management System. The ongoing management, follow-up and review conducted, keep risks inside the defined tolerance and acceptance levels. This information is reported to the ExCo and the Board of Directors' Audit and Risk Committee. Under the leadership of the Corporate VicePresidency

of Compliance, in 2021 Ecopetrol strengthened its Integrated Risk Management System based on the international technical standard ISO 31000 and the COSO ERM 2017 framework.

According to the level at which they are managed, Ecopetrol's risks can be classified as follows. (See Figure 8):

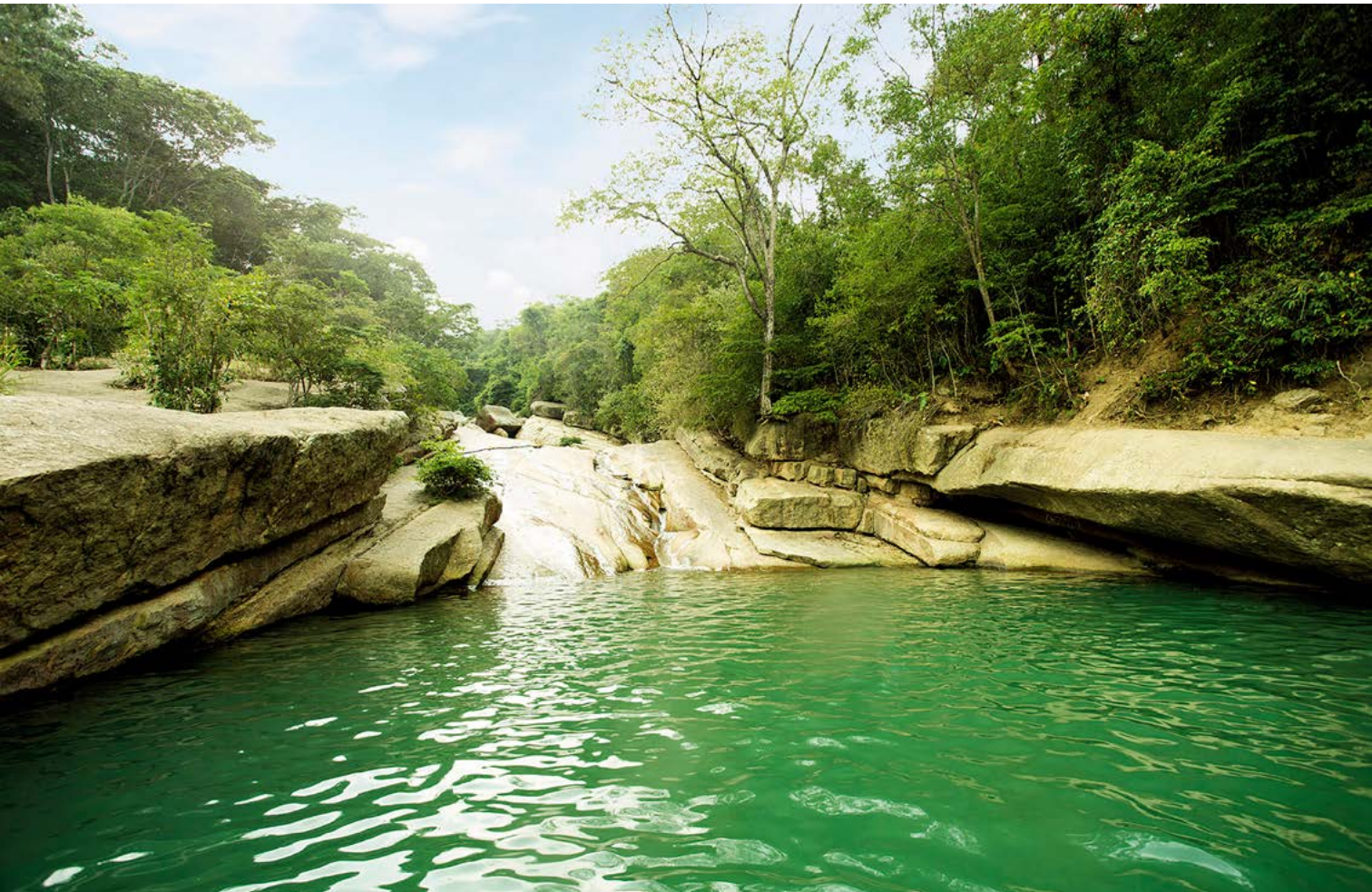
Figure 08.
Ecopetrol's Risk Levels



The construction and updating of the Business Risk Map are conducted based on the analysis of the internal and external environment, including market trends, specific risks of the Ecopetrol Group subsidiaries, management standards, industry risks, and other risks that are normally subject to analysis and review by sustainability indexes and radars. From this construction, themes and trends are obtained from which the updating of risks is proposed. These risks are recognized by the ExCo, reviewed by the Board's Audit and Risk Committee and finally presented to the Board of Directors.

Furthermore, the Company identifies and analyzes emerging risks and defines the response for each of these, which includes the following:

- (i) Incorporate as a new business risk.
- (ii) Incorporate into an existing business risk as cause or consequence.
- (iii) Continuously monitor emerging risks; or
- (iv) Eliminate from the emerging risk list.



3.2 Climate-related risks in the Business Risk Map

Ecopetrol's business risk map includes two relevant risks associated with climate change as follow: "inadequate management of climate change and water" and "asset competitiveness in relation to the energy transition". The latter was included in 2021 as a result of revising and updating the existing Business Risk Map and

replaced the "unsuccessful energy transition" risk, to ensure that the Company's assets are resilient to the possible impacts derived from climate change and the energy transition process that is underway. Below is information regarding the two (2) risks associated with climate change that are part of the Company's current Business Risk Map.

Inadequate management of climate change and water:

Components were identified for this risk at the strategic risk level concerning decarbonization (fugitive emissions and venting, reduction of flaring, renewable energy, energy efficiency, CNS) and water neutrality (water required to operate and effluent management).

Additionally, at the operational level, the components that impact the strategic layer include:

- (i) climate variability phenomena, such as: "El Niño/La Niña", cyclones, tropical waves, cold fronts, or other threats derived from extreme changes in precipitation and temperature, etc.;
- (ii) response to these extreme climatic situations; and,
- (iii) monitoring of regulatory changes in climate change and water.

For a detailed description of the risk, causes, consequences and mitigation measures, please refer to the Appendix with the technical description of the risks, Risk #15, available in its Spanish version.



Asset competitiveness in relation to energy transition:

For a description of the risk, causes and consequences please see the **Appendix** with the technical description of the risks, Risk #2, available in its Spanish version.



Components identified include those related to the strategy to reduce the risk of stranded assets in the Upstream (field mitigation and divestment) and Downstream (competitiveness and efficiency), gap closure or course of action to avoid entrapment, fuel quality and the closing of gaps in environmental compliance.

The mitigation actions for this risk are as follows (see Table 5):

Table 05. Measures to mitigate the "Asset competitiveness in relation to energy transition" risk

Process controls	Mitigation Measures
<ul style="list-style-type: none">Supply Chain ManagementDevelopment Opportunities ManagementIntegrated Portfolio ManagementStrategic Planning and AlignmentRefining and PetrochemicalsTechnology and Innovation	<ul style="list-style-type: none">Implementation of Ecopetrol's participation in Micro LNG.Assurance of the implementation of the Guide for the preparation and documentation of the Integrated Development Plan (IDP).Update of the stranded assets methodology .Application of the methodology for the identification of assets with risk of stranded assets for upstream segment.Implementation of digital tool to optimize portfolio management.

In 2021, Ecopetrol identified 13 trends categorized into: social, environmental, economic, technological and geopolitical; based on the analysis , 24 emerging risks were identified, which were assessed based on their potential

impact and the speed or rate at which each of them will emerge.

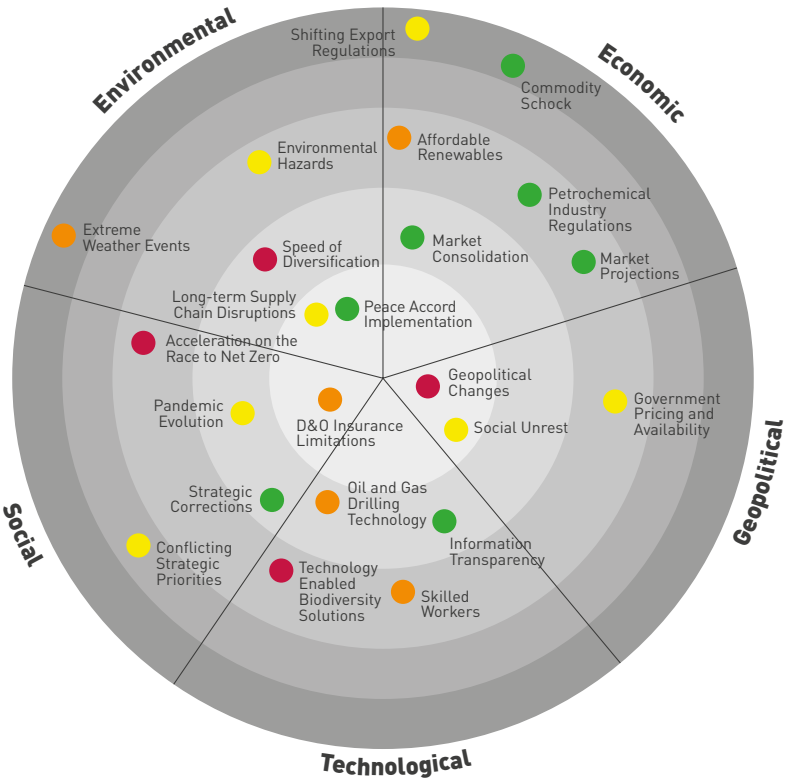
The results of this assessment are presented below (see Figure 9):

Impact Assessment: Bullet color corresponds to expected impact of risk

- Very high
- High
- Moderate
- Low
- Very low

Time Horizon:

- Now - In the context of Ecopetrol
- Near Future (1-3 Years)
- Foreseeable (3-5 Years)
- Distant Future (5-10 Years)
- Unknown Future (10+ Years)



Accordingly, the main emerging risks in the "Very High" category, associated with climate change, are as follows (see Table 6):

Table 06. Description and management of emerging risks related to climate change and energy transition

Risk	Description
Accelerating the "race" to net-zero emissions	The risk of climate change and sustainability initiatives (e.g., Colombia's Climate Action Law, tax credits, carbon credits) and the acceleration of reliable and cost-effective green alternatives may affect the Ecopetrol Group's energy diversification portfolio, strategic priorities and lead to an increase in expenditures associated with green initiatives and a reduction in the demand for core products.
Technology enabled nature-based capital solutions	The risk that the Ecopetrol Group does not adequately adapt its technological capabilities and strategies (e.g., nature-based solutions, Big Data analytics, remote sensing, robotics and drones, artificial intelligence) to effectively enable, assess and report on reducing its impact on Colombia's biodiversity (e.g. pollution, loss of habitats, deforestation and GHG emissions) given Colombia's increased sustainable development commitments leading to increased regulatory scrutiny and impacting strategic efforts and operations to minimize their impacts on relevant ecosystems.

3.3 Business risk alignment with TESG Strategy and the General Value with Sustainability pillar of the 2040 Strategy

Generating Value through TESG is based on the materiality exercise carried out in 2020. Along these lines, the Group's business risks are directly related

to the social, socio-environmental, environmental, eco-efficient, economic and governance and socio-economic dimensions, as shown in Figure 10.

Figure 10.
Business Risk Alignment with TESG Strategy

Impact in the regions where we operate, it will promote the principles of equality, connectivity and sophistication in the territories.



Anticipating the speed of change with the goal of state-of-the-art technology coupled with increased cyber security awareness

Climate Change Impact Mitigation, Decarbonisation, Integrated Water Management and Circular Economy are key technology-intensive themes.

Innovation will improve the company's processes, promoting greater efficiency and effectiveness.

- 1 Protection and incorporation of unsuccessful resources and reserves
- 2 Assets competitiveness in relation to the energy transition
- 3 Financial sustainability impact and value generation
- 4 Subordinates that do not fulfil the value promise
- 5 Environmental disruption incidents
- 6 Unsuccessful transition and incorporation of ISA to the EG
- 7 Spread of epidemics affecting operation
- 8 HSE events by operational cause
- 9 Projects that do not meet their value promise
- 10 Ethics and compliance violations
- 11 Cyber-attacks, leakage or loss of information
- 12 Organisational culture that does not leverage the strategy
- 13 Non-fulfilment of commitments by third parties
- 14 Impact on the operation or corporate governance due to geopolitical or regulatory changes, or provisions by oversight bodies or the state.
- 15 Inadequate management of climate change or water

THE ECOPETROL GROUP WILL CONTINUE TO REVIEW AND UPDATE ITS MATERIALITY MATRIX REGULARLY AND WILL CONSIDER THE POSSIBLE INCLUSION OF NEW RISKS IN THE BUSINESS RISK MAP.

For more information regarding the materiality analysis, please refer to the **Integrated Sustainable Management Report 2021**, Chapter 7 on Corporate *Responsibility* and TESG pp. 124-131



04

METRICS AND TARGETS

Ecopetrol reports its metrics and targets using consistent, reliable and comparable data. To this end, it has implemented reporting frameworks, such as SASB, CDP, DJSI, among others, which allow the Company to disclose its climate-related performance and ambitions.

4.1 Climate-related targets

In 2021, the Ecopetrol Group announced its **plan to achieve net zero carbon emissions by 2050**.



This plan includes the goal of reducing 50% of its scope 1, 2 and 3 emissions by 2050 and 25% of its scope 1 and 2 emissions by 2030, with respect to 2019, thereby contributing to Colombia’s commitment to reduce 51% of GHG emissions by 2030 following the mitigation targets established in the Paris Agreement.

To set the target, the Business Group’s GHG emissions for the 2019 base year were estimated at 13.5 MtCO₂e, which include emissions generated by the assets operated by Ecopetrol S.A., the Cartagena Refinery, the midstream segment (CENIT, ODL, Bicentenario, ODC and OCENSA), Hocol, Esenttia and assets in partnership.

Following best practices in GHG inventories, the Ecopetrol Group is making progress in updating the base year emissions taking into account, the following aspects:

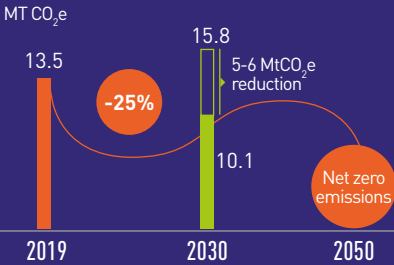
- (i) Direct measurements of methane emissions using Bottom-up and Top-down technologies and preparation of its own emission factors. This will increase the estimate of methane emissions in Ecopetrol S.A.’s assets;
- (ii) Inclusion of emissions from ISA and its subsidiaries; and
- (iii) Incorporation of emissions from Permian, Ecopetrol America and Brazil operations.

It is important to note that the company’s commitment to ensure that its emissions do not exceed 10.1 MtCO₂e by 2030 remains unchanged (see Figure 11).

Figure 11.
Ecopetrol’s Emissions reduction path to achieve Net Zero by 2050

TARGET 2030 ► **REDUCTION OF 25 % VS. 2019**
Scope 1 and 2

Scope 1 and 2



To achieve the 2030 goal, Ecopetrol is implementing projects and initiatives in energy efficiency, reduction of fugitive emissions and venting, reduction of flaring and renewable energies, which fall below USD 40/t CO₂e (equivalent to the internal carbon price set for 2030 and onwards). It is also making progress in research and development of emerging technologies, such as hydrogen and carbon capture, utilization and storage (CCUS).

It is estimated that to meet the target, around 30% of emissions are offset with Natural Climate Solutions projects, a percentage that could be reduced following the guidelines established for the Oil & Gas sector promoted by the Science Based Target Initiative (SBTi) or other applicable guidelines².

In relation to progress on the emissions

reduction target, a cumulative total of

493,441

tons of CO₂e was achieved between 2020 and 2021.

Between 2020 and 2024, a cumulative reduction of

1.6

million tCO₂e is expected.

In addition, the initiatives associated with renewables, energy efficiency and routine flaring have specific targets, as described below:



In terms of energy efficiency, the aim is to achieve a reduction in demand of more than 6% between 2028 and 2035 versus the 2017 baseline. As of 2021, a reduction of 3.1% has been achieved.

2018 - 2022
TARGET ▶ 3%

2018 - 2022
TARGET ▶ 6%

2028-2035
TARGET ▶ 6%+



In terms of renewable energies, the Company expects to reach between 400 MW and 450 MW by 2024, using 2018 as a baseline. By 2021, 112.8 MW for self-generation had been incorporated.

² In March 2022, the Science Based Target (SBTi) initiative published a Fossil Fuels Policy, which indicates the following assumptions: (i) pause validation of fossil fuel sector targets, (ii) will not accept new commitments from companies or subsidiaries according to defined categories, and (iii) elimination of previous commitments from companies in the oil and gas sector immediately. The updated guidance is expected to be published by the end of 2023. Once the specific guidance is published, Ecopetrol will review its ambition and alignment with SBTi.

³ Includes reductions achieved by Ecopetrol S.A., transportation segment (CENIT, ODL, Bicentenario, ODC and OCENSA), Hocol and Esenttia.

In terms of flaring, the Company is committed to reducing routine flaring to zero by 2030, in line with the global Zero Routine Flaring initiative led by the World Bank⁴. By 2021, a 43.7% reduction from the 2017 baseline had been achieved.

In 2022, a specific methane emissions reduction target will be announced in line with recent regulations issued by the Ministry of Mines and Energy regarding the reduction of flaring and venting in exploration and production activities, and the commitments made in the initiative led by the Climate and Clean Air Coalition (CCAC)⁵.

Regarding scope 3, Ecopetrol is considering the possibility of establishing a medium-term emissions reduction goal, including both the supply chain and customers in the efforts. To this end, the Company has included, as part of the green clauses of prioritized contracts, a decarbonization component to encourage the estimation of GHG emissions and propose mitigation and compensation measures. Additionally, Ecopetrol has initiated joint work with fossil fuel distribution customers to address the emissions generated in Colombia.

Ecopetrol assumed the commitment to be water neutral by 2045 by reducing by 66% the intake of fresh water for industrial use in its operations, eliminating discharges into freshwater bodies and offsetting 34% of the remaining water consumption. The Water Neutrality Roadmap was established to chart the way to water neutrality by 2045. This means replacing at least 100% of the water consumed by operations, generating a positive impact in each basin where withdrawals are made. Globally, the goals associated with water management are included in the Sustainable Development Goal 6, which seeks to guarantee universal access to safe and affordable drinking water for all by 2030. For this reason, through the comprehensive management of water, the Company seeks to contribute to the equitable, economically sound, and environmentally sustainable provision of water resources, aligned with Ecopetrol's Corporate Strategy, the Sustainability agenda, the Water Neutrality Roadmap, and the strategic pillars of climate action, biodiversity and circular economy.



⁴ Zero Routine Flaring, a World Bank initiative launched in 2015 with the support of the Global Gas Flaring Reduction Partnership (GGFRP), which seeks to eliminate routine gas flaring in fields as soon as possible and by 2030 at the latest.
⁵ Climate and Clean Air Coalition (CCAC), a United Nations-led initiative to assess methane sources and implement cost-effective methane abatement technologies and practices.

The following goals have been defined that will allow the Company to achieve the goal of water neutrality (measured versus the base year 2019):



Reduction of water withdrawn:

-14%
by 2022

-58%
by 2030

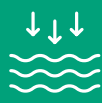
-66%
by 2045



Reuse of production water:

28.8%
by 2022

41.2%
of collected water
by 2022



Reduction of discharges to surface bodies:

-66%
by 2030

-100%
by 2045

For further information, please refer to the **Integrated Sustainable Management Report 2021**, Chapter 7 on *Environment* pp. 174-261



4.2 Metrics to assess climate-related opportunities and risks

Ecopetrol has implemented a set of metrics to establish targets and assess climate-related opportunities and risks, which are updated and monitored on an ongoing basis. To ensure data quality and traceability, the company used an SAP software solution developed, which integrates metrics associated with GHG emissions inventory, criteria pollutants and VOCs, water and waste.

Metrics related to GHG emissions

The data related to the GHG inventory of the assets operated by Ecopetrol S.A. includes emissions from the Cartagena Refinery. Currently, progress is being made in the integration of the emissions inventories of all the Ecopetrol's Group subsidiaries, which will be integrated and communicated in the 2022 report⁶.

Table 7 presents the metrics related to GHG emissions for the 2018 - 2021 period^[7].

⁶ Ecopetrol's GHG emissions inventory is prepared under the ISO 14064-1 methodology, specifically following the guidelines of the GHG Protocol Corporate Standard (scope 1), GHG Protocol Scope 2 Guidance (scope 2), Corporate Value Chain (scope 3) and Accounting and Reporting Standard (scope 3).

⁷ For 2021, Cenit, a Midstream subsidiary, was removed from Ecopetrol's operational control, therefore, for this report the historical series corresponding to the period 2018-2020 is recalculated. In relation to the

operation of the facilities of what is now an Ecopetrol subsidiary, Oleoducto de Colombia (ODC), the Company was responsible for the operational control thereof until January 2021, at which time it passes to its subsidiary Cenit. Consequently, Ecopetrol's inventory for 2021 includes GHG emissions generated at the facilities of this subsidiary during this month. Additionally, in 2020 Ecopetrol assumed the operation of the Pauto - Floreña Upstream asset, for which reason, for 2021, the emissions of this asset are included and the historical series 2018-2020 is recalculated.

Table 07.
Ecopetrol S.A. GHG Emissions Inventory Metrics

GHG Emissions	2018	2019	2020	2021
CO ₂ e emissions - scope 1 (ktCO ₂ e)	11,710	11,047	10,214	10,307
CO ₂ e emissions - scope 2 (ktCO ₂ e)	429	620	846	563 ^[8]
CO ₂ e emissions - scope 3 (ktCO ₂ e)	-	143,416	138,520	135,513
Use of product sold	-	136,862	132,948	128,583
Purchase of goods and services	-	4,981	4,323	5,731
Investments	-	1,281	987	919
Other categories	-	292	262	280
Reduction of GHG emission - New projects (ktCO ₂ e)	105	381	200	293
GHG emissions intensity - Upstream (Kg CO ₂ e/BOE Produced)	25.8	26.8	29.8	29.2
GHG emissions intensity - Downstream (Kg CO ₂ e/BOE Loaded)	44.0	42.1	41.9	39.7
GHG emissions intensity by revenue (MtCO ₂ e/BCOP)	-	-	0.254	0.139

In 2021, Ecopetrol's GHG emissions inventory was verified by Ruby Canyon Engineering under ISO 14064-1:2006. This firm validated the methodology used and recognized that the GHG emissions reported by Ecopetrol are accurate, consistent, transparent and without notable discrepancies for the 2017-2020 period. Ecopetrol established a biennial verification frequency for this purpose.



**THE METRICS
PUBLISHED IN
THE INTEGRATED
SUSTAINABLE
MANAGEMENT REPORT
WERE VERIFIED
BY THE FIRM EY, IN
ACCORDANCE WITH
THE INTERNATIONAL
STANDARD ISAE3000.**

⁸ Scope 2 emissions decreased due to the change in the National Interconnected System's emission factor, as calculated by the Mining and Energy Planning Unit (UPME). The values presented are calculated under the market-based method, considering that they are higher than the location-based method.

Other environmental metrics

Regarding other environmental metrics, Table 8 presents data associated with criteria pollutants and VOCs, water, energy, waste, and fuel quality.



Table 08.
Other environmental metrics of Ecopetrol S.A.

Criteria pollutants and VOC	2016	2017	2018	2019	2020	2021
NOx Emissions (Ton)	21	29	28	29	31	28
SOx Emissions (Ton)	21	27	26	26	23	15
VOC Emissions (Ton)	107	109	109	115	114	112
Water	2016	2017	2018	2019	2020	2021
Reused water /Total water required (%)	55.7	56.0	59.7	62.1	65.0	74.0
Reused water (m³)	89,286	0	52,483	1,159,113	3,135,473	2,305
Fresh water capture (hm³)	56	56	58	55	51	40
Energy	2016	2017	2018	2019	2020	2021
Total energy consumption (GWh)	5,163	6,627	6,830	7,198	6,979	6,558
Self-generation of energy (GWh)	4,158	4,334	4,734	5,183	4,745	4,222
Self-generation with natural gas (GWh)	-	2,838	2,704	2,829	3,543	3,107
Self-generation with crude (GWh)	-	-	1,868	2,170	968	948
Self-generation with LPG (GWh)	-	162	161	179	206	113
Self-generation with solar energy (GWh)	-	0	0	6	28	54
Purchase of energy (GWh)	1,005	2,293	2,096	2,016	2,234	2,336
Renewable energy capacity (MW)	-	43	43	64	21	82
Waste Management	2016	2017	2018	2019	2020	2021
Amount of non-hazardous waste (Ton)	49,165	103,627	178,294	211,506	157,700	199,717
Amount of non-hazardous waste used (Ton)	27,679	28,541	135,118	201,320	31,863	47,566
Amount of hazardous waste used (Ton)	119	11	135	92	3,884	6,106
Fuel quality (ppm)	2016	2017	2018	2019	2020	2021
Amount of sulfur in diesel– Barrancabermeja	21	21	10	10	9	13
Amount of sulfur in gasoline – Barrancabermeja	203	158	94	95	79	66
Amount of sulfur in diesel – Cartagena	32	29	13	6	6	5
Amount of sulfur in gasoline – Cartagena	103	104	55	44	40	38

* Assets operated by Ecopetrol S.A. (includes Cartagena Refinery)

For more detailed information on the metrics refer to:

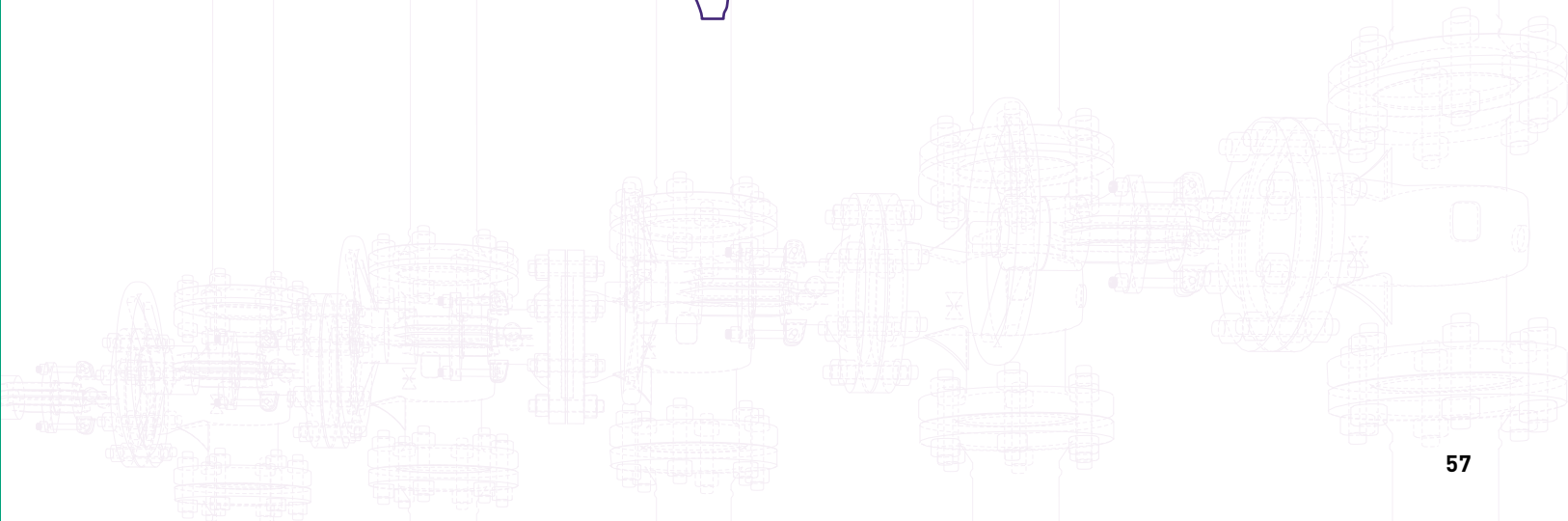
Integrated Sustainable Report 2021. *Environment* chapter, sections Climate action, Water neutrality, Use of alternative energies and sources, Fuel quality, Clean air for the environment, Integrated waste management].



Reporte de Métricas – Sustainability Accounting Standards Board (SASB) 2021, metrics for Ecopetrol and its subsidiaries, available in its Spanish version.



Quarterly Reports.





05
TCFD
TABLE OF
CONTENTS

The following table (see Table 9) presents the relationship between specific TCFD recommendations and disclosures and the sections of this report. It also refers to documents where more detailed information can be found.

Recommendation	Disclosure	Ecopetrol Group Report	Detailed information ⁹
Governance: Disclose the organization's governance around climate-related opportunities and risks.	a) Describe the Board's oversight of climate-related opportunities and risks.	1.1 Board's oversight of climate-related opportunities and risks.	ISMR 2021- Message to Stakeholders: pp. 12-15, Governance structure: pp. 134-135, Board of Directors: p. 136-139 20-F 2021- 7. Corporate Governance System: p. 200, 7. 3 Board of Directors: p. 205 ACGR 2021 – Operation of the Board of Directors and its Committees: pp. 13-22 2020 CDP Climate – Chp.1. Governance
	b) Describe management's role in assessing and managing climate-related opportunities and risks.	1.2 Management's role in assessing and managing climate-related opportunities and risks.	ISMR 2021 - Operation of the Board of Directors, information management and decision-making process: p. 136, Board Members: pp. 147-151, Risk Management System: pp. 140, 166 20-F 2021 – 7.3.2 Board Committees: p. 212, 7.6 Compensation of Directors and Management: p. 218 ACGR 2021 - Operation of the Board of Directors and its Committees: pp. 13-22, Senior Management Selection, Development and Remuneration pp. 24-25, Control Environment pp. 27-31
Strategy: Disclose the current and potential impact of climate-related opportunities and risks on the organization's business, strategy and financial planning, where such information is material.	a) Describe the climate-related opportunities and risks identified by the organization in the short, medium and long term.	2.1 Climate-related opportunities and risks	ISMR 2021 - 2040 Strategy: pp. 19-21, TESG: pp. 124-131, Environmental strategy: p. 176, Emerging risks. pp. 171-172, Climate change: pp. 182-183, Comprehensive water management: pp. 192-194, 198-200, Biodiversity: pp. 206-208, Circular economy: pp. 220-222, Use of alternative energies and sources: pp. 226-227, Fuel quality: pp. 238-239, Air quality: pp. 244-246 20F 2021 - 2.1.1 2040 Strategy: Energy that Transforms: p. 5, 3.11 Technology, Environment, Social and Governance (TESG): p. 79, 5.2 Risk Factors: pp. 140- 176 Ecopetrol website: Risk management

⁹ 20F - form 20-F filed with the Securities and Exchange Commission
ISMR- Integrated Sustainable Management Report
ACGR-Annual Corporate Governance Report
SASB-Sustainability Accounting Standards Board Metrics Report

Recommendation	Disclosure	Ecopetrol Group Report	Detailed information ⁹
	b) Describe the impact of climate-related opportunities and risks on the organization's business, strategy and financial planning.	2.2 Impact of climate-related opportunities and risks on the organization's business, strategy and financial planning.	<p>ISMR 2021 – Investments and environmental expenses: pp. 177-178, Climate change: pp. 182-183, Comprehensive water management: pp. 192-194, 198-200, Biodiversity: pp. 206-208, Circular economy: pp. 220-222, Use of alternative energies and sources: pp. 226-227, Fuel quality: pp. 238-239, Air quality: pp. 244-246</p> <p>SASB 2021 - EM-EP-420a.3 (1) Amount invested in renewable energies, (2) revenues generated by the sale of renewable energies: p. 23, EM-EP-420a.4 Analysis of how the price and demand for hydrocarbons or climate regulation influence the capital investment strategy for exploration, acquisition and development of assets: p. 24</p> <p>20-F 2021 - 2.1.2. 2022 – 2024 Business Plan: p. 6, 2.1.1 2040 Strategy: Energy that Transforms: p. 5</p> <p>2020 CDP Climate - C3. Business Strategy (C3.4)</p> <p>Ecopetrol website: Risk management</p>
	c) Describe the resilience of the organization's strategy, taking into consideration different climate related scenarios, including a 2°C or lower scenario.	2.3 Scenario analysis	2020 CDP Climate - C3. Business Strategy (C3.2)
Risk Management			
Disclose how the organization identifies, assesses, and manages climate-related opportunities and risks.	a) Describe the organization's processes for identifying and assessing climate-related risks.	3.1 Integrated Risk Management System	<p>ISMR 2021 – Risk Management System pp. 166-170</p> <p>SASB 2021 - EM-EP-320a.2 Analysis of management systems used to integrate a culture of safety throughout the exploration and production life cycle.: p. 21, EM-EP-540a.2 Description of the management systems used to identify and mitigate catastrophic and ultimate risks.: p. 31</p> <p>20-F 2021 - 5.3. Risk Management: p. 171</p>
	b) Describe the organization's processes for managing climate-related risks.	3.2 Inclusion of climate-related risks in the business risk map	<p>ISMR 2021 – Business Risk Management, Emerging risk Management: pp. 170-172</p> <p>20-F - 5.3. Risk Management: p. 171, 5.3.2 Managing Low Carbon Economy and Climate Change Risks: p. 173</p> <p>2020 CDP Climate - C2. Opportunities and risks (C2.1)</p>

Recommendation	Disclosure	Ecopetrol Group Report	Detailed information ⁹
	c) Describe how the processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management.	3.2 Inclusion of climate-related risks in the business risk map. 3.3 Aligning business risks with ESG (Environmental, Social and Governance) issues and TESG strategy.	<p>ISMR 2021- Risk culture: p. 173</p> <p>2020 CDP Climate - C2. Opportunities and risks (C2.2)</p>
Metrics and Targets:			
Disclose metrics and targets used to assess and manage relevant climate-related opportunities and risks where such information is material.	a) Disclose the metrics used by the organization to assess climate-related opportunities and risks in line with its strategy and risk management process.	4.2 Metrics for assessing climate-related opportunities and risks.	<p>ISMR 2021 – Investments and environmental expenses: pp. 177-178, Climate change: pp. 185-189, Comprehensive water management: pp. 201-205, Biodiversity: pp. 214, 215, 219, Circular economy: p. 225, Use of alternative energies and sources: pp. 228-233, Fuel quality: p. 243, Air quality: pp. 248-250, Comprehensive waste management: pp. 256-261</p> <p>SASB 2021 - Air quality EM-EP-120a.1: p. 7, Water management EM-EP-140a.1, 140a.2, 140a.3, 140a.4: pp. 8-9</p> <p>Ecopetrol website: 1Q22 Quarterly results – TESG Dashboard</p>
	b) Disclose Scope 1, Scope 2 and, Scope 3, if applicable, GHG emissions and related risks.	4.2 Metrics for assessing climate-related opportunities and risks.	<p>ISMR 2021 – Direct and indirect GHG emissions Scope 1,2 and 3: p. 185</p> <p>SASB 2021 – GHG Emissions EM-EP-110a.1: pp. 3-4</p>
	c) Describe the targets used by the organization to manage climate-related opportunities and risks and performance as compared to its targets.	4.1 Ecopetrol's climate-related targets	<p>ISMR 2021 - Environmental strategy targets: p. 176, Climate change: p. 184, Comprehensive water management: p. 195, Biodiversity: p. 209, Circular economy: p. 223, Use of alternative energies and sources: p. 228, Fuel quality: p. 240, Air quality: p. 247</p> <p>SASB 2021 - Discussions on short- and long-term strategy and/or plan to manage emissions EM-EP-110a.3: p. 5</p> <p>2020 CDP Climate - C4. Targets and performance.</p> <p>Ecopetrol website: Greenhouse Gas Mitigation, 1Q22 Quarterly Results - TESG Dashboard</p>

GLOSSARY OF ACRONYMS

ANDI: National Business Association of Colombia for its Spanish acronym

BSC: Management’s Balanced Scorecard

CCAC: Climate & Clean Air Coalition

CCUS: Carbon Capture, Utilization and Storage

CEO: Chief Executive Officer

CFO: Chief Financial Officer

CH₄: Methane

CO₂: Carbon dioxide

DJSI: Dow Jones Sustainability Index

EBITDA: Earnings before interest, taxes, depreciation, and amortization

ECCN: Colombia Carbon Neutrality Strategy for its Spanish acronym

EII: Salomon Energy Intensity Index

ELC: Entity Level Control

ESG: Environmental, Social and Governance

ExCo: Executive Committee

GGFR¹⁰: Global Gas Flaring Reduction Partnership

GHG: Greenhouse gas

GRI: Global Reporting Initiative

HSE: Health, Security and Environment

IDEAM: Colombian Institute of Hydrology, Meteorology and Environmental Studies

IEA: International Energy Agency

IPCC: Intergovernmental Panel on Climate Change for its Spanish acronym

IRMS: Integrated Risk Management System

ISA: Interconexión Eléctrica S.A. E.S.P.

ISMR: Integrated Sustainable Management Report

KRI: Key Risk Indicator

LDAR: Leak Detection and Repair

LPG: Liquefied Petroleum Gas

LTI: Long-Term Incentives

MHCP: Colombian Ministry of Finance and Public Credit for its Spanish acronym

NCRE: Non-conventional renewable energy sources

NCS: Natural Climate Solutions

NDC: Nationally Determined Contribution

NOX: Nitrogen oxides

NPV: Net Present Value

OGMP: Oil & Gas Methane Partnership

PCH: Small Hydroelectric Center (power plan)

PES: Payment for Environmental Services

PID: Integrated Development Plan for its Spanish acronym

PIGCCme: Colombia’s Comprehensive Climate Change Management Plan for the Energy and Mining Sector for its Spanish acronym

PNCN: National Carbon Neutrality Program for its Spanish acronym

PNCTE: National Program of Tradable GHG Emissions Quotas for its Spanish acronym

PVS: Wildlife Project for its Spanish acronym

RAM: Risk Assessment Matrix

RCP: Representative Concentration Pathways

RENARE: National Registry of GHG Emission Reductions for its Spanish acronym

VOC: Volatile Organic Compounds

Legal Disclosure

This document was prepared by Ecopetrol S.A. to provide the market and other interested parties with certain financial and other information about the Company.

This report contains forward-looking statements relating to the probable development of the Company's business and estimated results. Such forward-looking statements include information regarding the Company's current estimates, approximations or expectations relating to the Company's future financial and operating results. Potential investors, the public and the market, in general, are cautioned that such information is not a guarantee of performance, that it may subsequently change and that risks of uncertainty affecting the Company and its business may occur and materialize.

Actual results may fluctuate from the Company's future projections due to various factors beyond the issuer's control. Investment decisions based on the information provided are the sole responsibility of the investors.

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The information referred to in this work material, expressed in facts, data, figures and/or statistics concerning companies or entities that may be considered as Ecopetrol's peers in the industry where it carries out its activities, corresponds to publicly available information that may be freely consulted by anyone. Ecopetrol is not responsible for the accuracy, veracity and/or precision of the information of the companies or entities mentioned in the work material and which is used for strictly illustrative and statistical purposes.

For more information, please contact
Ecopetrol Investor Relations Team
investors@ecopetrol.com.co



ECOPETROL S.A.
@ECOPETROL_SA
@ecopetroloficial



Pacto Global
Red Colombia



2022

