Ecopetrol´ s Emerging risks

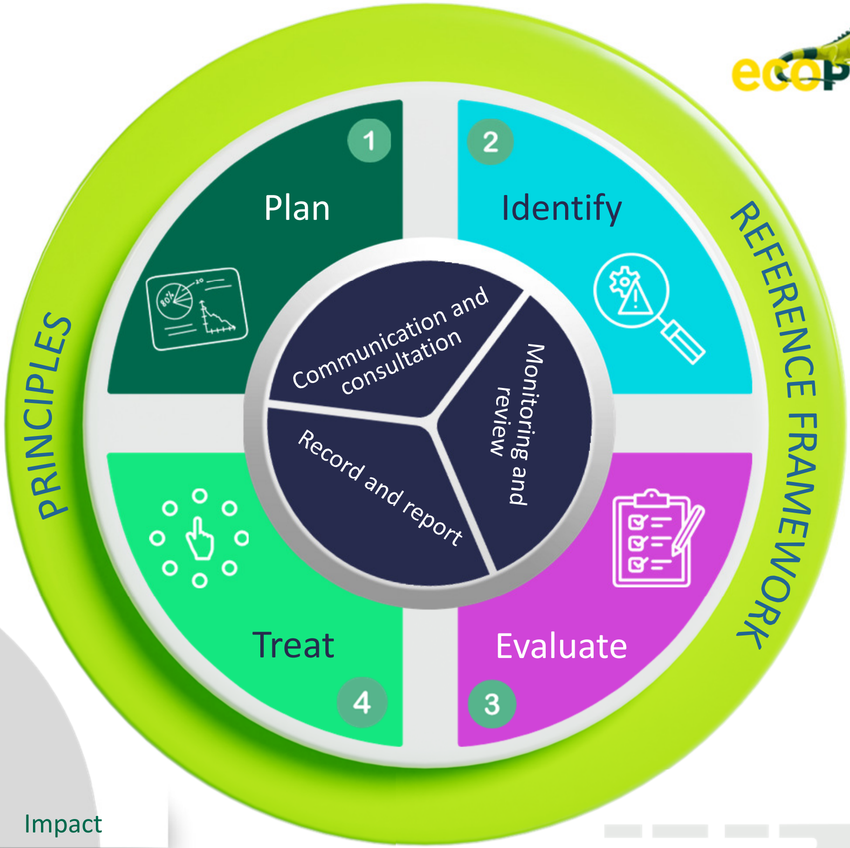
¿How do we define them?

Ecopetrol defines emerging risks as new or arising situations which are expected to have a long-term future impact on the company (3-5 years and beyond) or in some instances, they have already begun to impact the company.

Emerging risks are considered those that meet some of the following criteria:

1. The risk is new or it´s importance is significantly increasing.
2. Familiar risk but presented in a new or unfamiliar context or under new context conditions.
3. The potential material financial or reputational impact of the risk is long-term and significant.
4. It arises from external events to the company which are beyond its influence or control.
5. It has a specific impact on the company.
6. Has a high potential impact to Ecopetrol and may require Ecopetrol to adapt its strategy and/or business model.

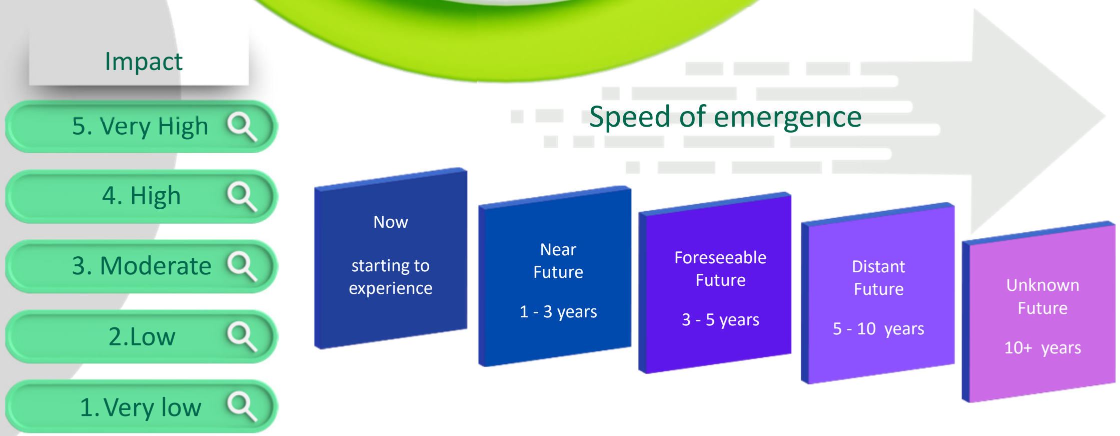
Ecopetrol´s Emerging risks



¿How do we identify them?

By applying the stages of the Risk Management Cycle, Ecopetrol understands, analyzes, and records emerging trends and the risks derived therefrom.

Emerging risks are assessed based on criteria of potential impact (5 possible levels) and speed of emergence (time horizon of possible occurrence) in order to prioritize them and determine the most appropriate treatment.



Emerging trends

¿How do we identify them?

Ecopetrol systematically identifies emerging trends with potential impact on its business strategy and operations, considering the following approach:

- Assessment of the external environment and external conditions that could affect the company[1].
- Analysis of all trends to identify signals in the industry and their connection to the company, seeking to address all critical areas and classifies them into the categories set forth by WEF (social, technological, economic, geopolitical, and environmental).
- Identification of emerging risks for the company derived from the trends analyzed. The risks are evaluated in order to determine their treatment as emerging, business, or tactical risk.

1. It includes, among others, information and strategic intelligence studies from the World Economic Forum, reports and interviews with consulting and insurance firms, reports on the industry, the economy and geopolitical issues in the regions where Ecopetrol operates.

Emerging trends for 2023

Based on the analysis carried out in different joint construction scenarios, Ecopetrol identified the following trends in the external environment that have the greatest influence on the company, from which the emerging risks arise:

Social
- Fair energy transition roadmap in Colombia.
- Effects of consumer behavior in the market.
- Shortage of human talent in Oil & Gas industry.
- New pandemics.

Economic
- Cost of living crisis.
- Supply Chain Challenges.
- Reorientation of investment.

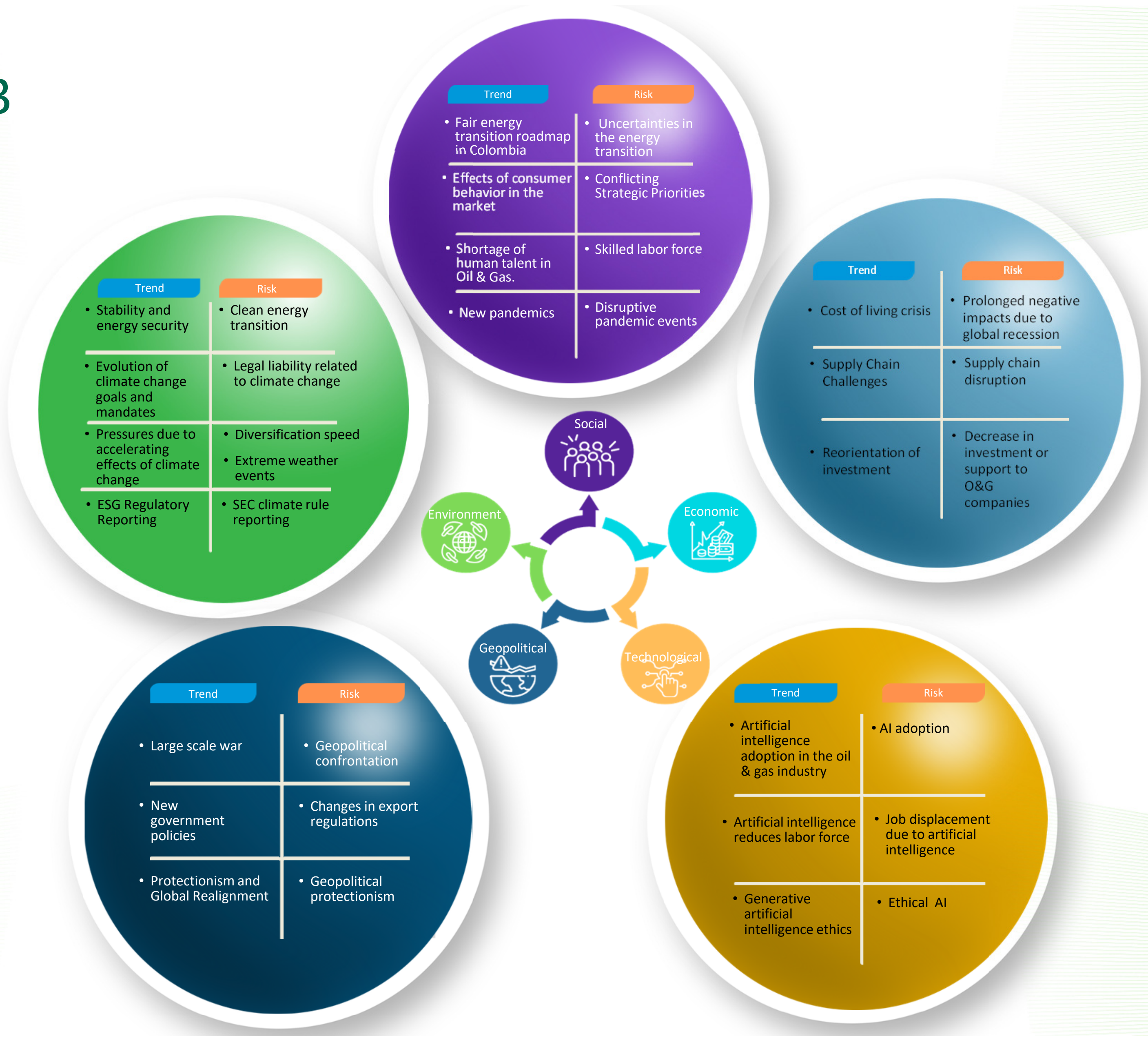
Technological
- Artificial intelligence adoption in the Oil & Gas industry.
- Artificial intelligence reduces labor force.
- Generative artificial intelligence ethics in human resources.

Geopolitical
- Large scale war.
- New government policies.
- Protectionism and Global Realignment.

Environmental
- Stability and energy security.
- Evolution of climate change goals and mandates.
- Pressures due to accelerating effects of climate change.
- ESG Regulatory Reporting.

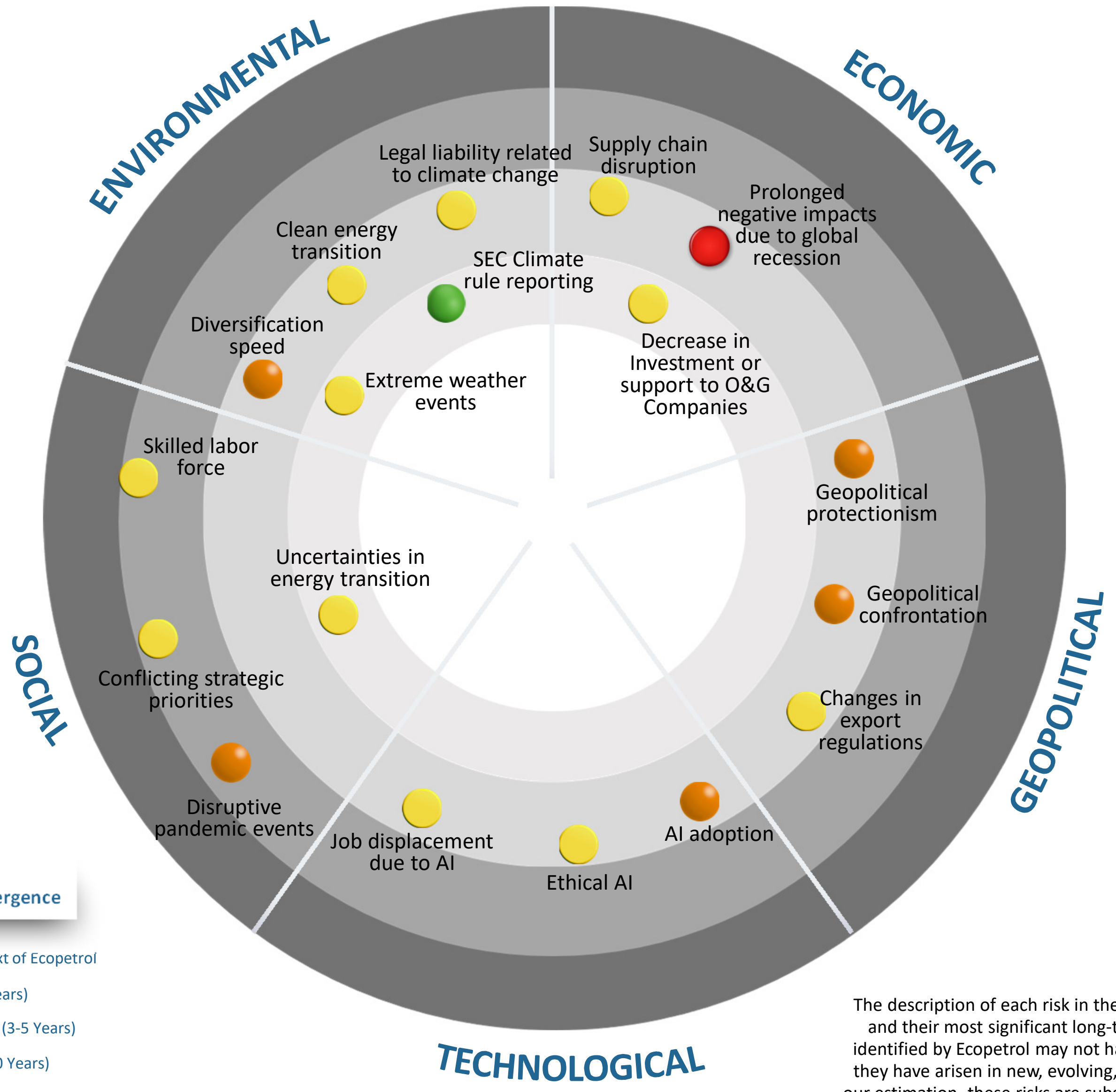
Ecopetrol 2023 Emerging risks

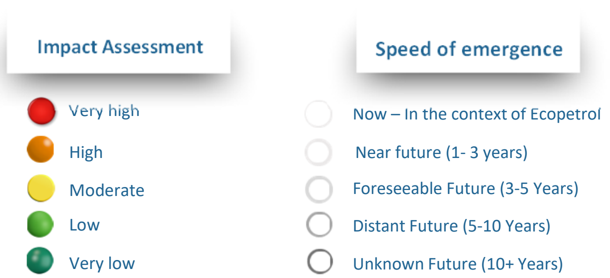
As a result of the application of the methodology described above, the following is a summary of the trends and risks identified for each category:



2023 Emerging risk assessment

According to our methodology to identify the most relevant emerging risks, the following is an evaluation of the Ecopetrol´s emerging risks based on impacts and speed of mergence levels:





Considering the long-term impacts on the company (3-5 or more years) and the speed of emergence, the main Ecopetrol´s emerging risks are:

- Geopolitical confrontation.
- AI adoption.
- Diversification speed.
- Prolonged negative impacts due to global recession.

The description of each risk in the graph above highlights their emerging nature and their most significant long-term impact. While some aspects of the risks identified by Ecopetrol may not have been entirely unprecedented before 2023, they have arisen in new, evolving, and unfamiliar contexts. More significantly, in our estimation, these risks are substantially growing in importance for Ecopetrol, a crucial factor in our risk analysis

Emerging risk: Geopolitical Confrontation

Trend: Large scale war

Geopolitical

Description

A new large-scale war erupting, which could disrupt global supply chains and international markets, poses a significant threat to Ecopetrol's ability to export products or acquire supplies and raw materials for hydrocarbon production in the foreseeable long term (i.e., three to five years). Furthermore, the potential formation of blocs and alliances among countries in the region as a result of the conflict could further disrupt trade, capital markets, and the mobility of people, among other potential consequences.

Background

War will pose a more serious threat over the next decade than current conflicts. Military expenditures have surged in nations including the United States, Iran, Israel, India, Russia, China, and Saudi Arabia, with the private sector ramping up the development of military technology. New technologies change the nature of threats in terms of international security. Consequently, this could lead to the erosion of social cohesion, geo-economic clashes, and widespread migration due to the risks posed by technological threats and the specter of mass destruction.

Potential impact for Ecopetrol

The occurrence of this risk would lead to significant impacts on both, the business and the adaptation of Ecopetrol's strategy and business models, as explained below.

Impacts on business:

- Interruption or limitations in the supply chain, as well as restrictions in the logistic channels required for the acquisition of raw materials necessary to produce hydrocarbons, their derivatives and clean energies.
- Unavailability, limitations or significant delays in the acquisition of raw materials necessary for the development of alternative energy projects that generate new negotiations with suppliers and affect prices and product quality (e.g. copper, lithium, nickel and cobalt).
- Material increases in costs associated with revenue generation and project development which in turn could affect the economic viability of the projects and reduce the Company's profitability margins.
- Increase in costs associated with insurance required for the transportation of products.
- Underutilization of refinery capacity due to lower availability of inputs, generating lower profitability margins.
- Restrictions on access to international markets or definition of new spreads that would reduce sales and force Ecopetrol to modify its commercialization strategy.

Impacts on strategy adaptation or business models:

- The potential of occurrence of an economic recession could result in reduced demand for crude oil and its derivatives, leading to exchange rate fluctuations, inflationary pressures, and other macroeconomic indicators. This could subsequently lead to price reductions, impacting Ecopetrol's revenue generation and increasing raw material costs.
- The accumulation of crude oil and refined product inventories available for sale could lead to heightened storage costs and the tying up of working capital.
- Potential increases in the cost of debt, interest rates, and risk premiums associated with ~~the~~ cash flows required to support the company's operations may also occur.

Mitigation activities

- Tracking and monitoring ~~of~~ relevant environmental variables in the supply chain (CPI consumer price index, country risk, control lists, among others) to take actions to reduce the impact on the supply of goods and services or to adjust the supply plan.
- Implementation of negotiations at corporate group level to gain economies of scale.
- Alignment of logistics systems to the business group, to maintain stock of inventories or critical materials.
- Implementation of long-term investment plans that allow for negotiations to maintain favorable prices.
- Market intelligence for timely action and for adaptation to disruption in the global supply chain, or decision-making regarding regions which Ecopetrol has commercial relations and that may be affected by the occurrence of conflicts.
- Definition and inclusion of smart indexation clauses in supply contracts that allow for better control of increases in unit costs.
- Consideration of geopolitical criteria in negotiations for the purchase and sale of crude oil and its derivatives on behalf of commercial roles.
- Internationalization of commercialization by creating trading companies in Singapore and the United States, which allow taking competitive advantages in international markets.
- Increased presence and exposure to the maritime market, maximizing the diversification of markets, evacuation routes, clients, terms and commercial agreements with clients and suppliers, among others.

Technological

Emerging risk: Artificial intelligence adoption

Trend: Artificial intelligence adoption in the oil & gas industry

Description

The risk of new artificial intelligence (AI) technologies being developed by competing companies at a much faster pace than Ecopetrol. This could confer significant competitive advantages to these competitors over Ecopetrol and its traditional hydrocarbon business in the foreseeable long term (e.g., 3 to 5 years). Such competitive advantages might encompass innovations in alternative energy projects, emissions reduction, nature-based solutions, and more. This scenario could potentially result in Ecopetrol failing to meet both internal and external expectations regarding the implementation of technology and innovation as the primary drivers for sustainable growth. Consequently, Ecopetrol could face the loss of market opportunities.

Background

Once thought of as a conservative industry, the oil and gas industry is being transformed by AI and the new possibilities it has brought to the sector (eg, predictive maintenance, demand forecasting, energy trading and pricing, etc.). A vast majority of oil and gas companies worldwide are either currently investing in artificial intelligence or have plans to do so within the next 5 years. The impact of artificial intelligence is already discernible, with 50% of industry executives using it to address challenges across their organizations.

Potential impact for Ecopetrol

The occurrence of this risk would lead to significant impacts both on the business's operations and on the adaptation of Ecopetrol's strategy and business models, as explained below:

Impacts on business:

- Longer times for the implementation of AI-based technologies aimed at maximizing hydrocarbon production levels, revenue generation, and cash flow generation.
- Stranded upstream assets due to delays in the implementation of AI solutions that allow incorporation and exploitation of oil and gas reserves, resulting in higher costs and lower revenues.
- Reduced competitiveness of the hydrocarbon business line expressed in higher operating costs in comparison to peer companies.

Impacts on strategy adaptation or business models:

- Failure to meet commitments, obligations, and expectations established for the medium and long term related to climate change, water, and biodiversity.
- Delayed response to regulations related to energy transition, i.e., in the generation of hydrogen and other renewable energy sources.
- Difficulties in the generation of decarbonized products that would affect market share with a tendency to prefer more diverse alternative energy companies.

Mitigation activities

- Continuous follow-up and monitoring of AI solutions and developers available in the market, to implement projects or adapt technologies to the company's existing needs.
- Generation of alliances with companies in the sector or with companies that develop AI solutions.
- Establishing and deploying open innovation networks to structure and foster activities aimed at advancing science, technology, innovation, and entrepreneurship. These networks are instrumental in proposing solutions to industry challenges regarding energy transition, decarbonization, biodiversity conservation, and other pertinent issues.
- Synergies with the Colombian Petroleum Institute to take advantage of highly specialized technological and scientific talent and infrastructure.
- Allocation of resources in investment plans for the execution of projects to develop and incorporate AI solutions.
- Evaluate possible allocations of exclusive economic resources for experimentation in AI-based technological developments, among others

Emerging risk: Diversification speed

Environment

Trend: Pressures due to accelerating effects of climate change

Description

The risk that the pace and relevance of diversification in the incorporation of renewable energies by peer companies will be faster than the pace defined in Ecopetrol's strategic position. This situation could lead to the company being unable to make timely investments or swiftly incorporate renewable energies and alternatives to fossil fuels. Concurrently, investors may shift their preferences from traditional oil companies towards more diverse alternative energy companies while consumers may exhibit a growing preference for renewable energy sources in the foreseeable future (e.g., 3 to 5 years).

Background

Increased incentives for renewables, a sharp increase in carbon taxes, progress towards Colombia's zero net emission targets, and the expected decline in demand for fossil fuels are motivating companies in the sector to rapidly change the composition of energy source distribution, revolutionizing the sector in Colombia and abroad.

Potential impact for Ecopetrol

A faster pace of peer companies compared to Ecopetrol's strategy in the development of initiatives and projects of energy transition and alternatives to fossil fuels could imply relevant impacts both in the business and in the adaptation of Ecopetrol's strategy or business models as explained below.

<u>Impacts on business:</u>

- Failure to meet the competitive return indicators of the oil and gas traditional business line.
- Limitations in accessing financing resources for projects with long-term returns.
- Failure to meet decarbonization goals and expectations due to prioritization of projects of a different nature.
- Deviation of the expected benefits of projects associated with energy transition due to lack of technologies and time required to achieve the necessary lessons required to enter new markets.
- Changes to supply and demand of energy in Colombia and elsewhere, impacting fuel and energy prices and generating lower revenues for Ecopetrol.

<u>Impacts on strategy adaptation or business models:</u>

- Reputational impact affecting the company’s credit rating, generating a potential increase in interest rates and restricting access to markets or investors.
- Impact on the Company’s crude oil commercialization for not having the quality of fuels required by the market.

Mitigation activities

- Structuring of differentiated funding levers for the development of projects associated with energy transition.
- Identification and selection of strategic allies (e.g., investment partners, technological partners, equity investors, among others) for the development of projects associated to energy transition.
- Active participation and monitoring of new rules and regulations, as well as changes to the existing ones, which foster or promote the implementation of low-emission projects.
- Leveraging on tax incentives for projects associated to energy transition

Economic

Emerging risk: Prolonged negative impacts due to global recession

Trend: Cost of living crisis

Description

The risk that a severe global and/or Colombian economic crisis begins to manifest in the upcoming years without timely or effective responses that allow normalization of macroeconomic indicators, such as OPEC´s intervention in the oil market, central banks actions against inflation (e.g., contraction of spending and increase in interest rates), or other insufficient fiscal and monetary policies, all of which could lead to adverse impacts. These negative impacts may be prolonged and might not fully materialize for at least 3 to 5 years. Consequently, there could be a sustained contraction in energy demand, thereby impacting Ecopetrol's ability to produce and sell profitable hydrocarbons.

Background

Governments will continue to struggle with striking a balance between safeguarding a broad spectrum of their citizens from a protracted cost-of-living crisis and fulfilling debt servicing obligations amidst revenue pressures caused by economic recession, the imperative of transitioning to new energy systems, and an increasingly volatile geopolitical landscape. Fluctuations in food, fuel, and other costs heighten social vulnerabilities, resulting in constrained access to essential goods.

A cost-of-living crisis will incite demands from populations for national governments and business leaders to tackle socioeconomic challenges. The impact of global inflation will serve as the primary catalyst for a global recession, amplifying financial strains and fueling social unrest and political instability worldwide. In more autocratic jurisdictions, protests may pose heightened challenges and lead to increased repression and political upheaval. This scenario would introduce volatility and disruption into the business environment and energy demand, particularly if economic conditions continue to be disappointing.

Potential impact for Ecopetrol

A long recovery period derived from a potential global recession that in turn affects our main partners (customers and suppliers) and the Colombian economy, would lead to relevant impacts on both the business and the adaptation of Ecopetrol's strategy and business models, as explained below.

Impacts on business:

- Protectionism and restrictions on access to international markets that would reduce sales and force Ecopetrol to modify its marketing strategy.
- Underutilization of refinery capacity due to lower availability of required material, generating lower profitability margins.
- Accumulation of crude oil and refined product inventories available for sale, generating higher storage costs.
- Increase in operating costs or debt costs indexed to the exchange rate.

Impacts on strategy adaptation or business models:

- Decrease in prices and demand for crude oil and its derivatives affecting Ecopetrol's revenue generation.
- Potential increases in the cost of debt, interest rates and risk premiums associated with the cash flows required to foster the Company's operations.
- Decrease in Capex investments affecting the reserve replacement rate.
- Asset lock-in that could lead to a decrease in production or replenishment of reserves.

Mitigation activities

- Tracking and monitoring of market variables and signals (e.g., inflation rates, long-term interest rates, expected growth rates), crude oil and refined products price forecasts to recommend actions to be implemented.
- Take advantage of favorable prices to implement price hedges and diesel differentials ensuring minimum prices to maintain sales prices.
- Evaluation of storage options for crude oil and refined products in times of low prices for subsequent marketing at better prices.
- Diversification of product sales in different destinations.
- Stable fuel price policy to balance the fuel price stability fund – FPEC (for its acronym in Spanish).

INNOVATION AND ENERGY
TO SHAPE THE FUTURE