



Alignment with TCFD and quantification of climate risk

Tactical Committee 5: February 3rd, 2022

Objective

i) Define climate scenarios and identify and quantify climate risks and opportunities



01

DEVELOPMENT
OF CLIMATE
SCENARIOS

- Developing complete climate scenarios, taking IEA and IPCC as reference.
- Consolidating the following scenarios: Accelerated transition, Moderate transition, Slow transition.
- Identifying and estimating climatic variables.



02

IDENTIFICATION
OF CLIMATE
RISKS

- Identifying physical risks (Chronic and Acute) and transition risks (Political, Market, Technological and Reputational).
- Identifying climate opportunities (energy sources, markets, resource efficiency and resilience).



03

CLIMATE
QUANTIFICATION

- Developing workshops and joint work with the different areas of Promigas.
- Execution of calculations and support throughout the process. Aggregated calculation of CVaR for physical risks.
- Preparing an executive report.

Note 1: The quantification of physical risks is based on the information provided by the different Promigas companies (Transmetano, Promioriente, Transoccidente, SPEC and Promisol). Transition risks and opportunities were identified although they were not quantified.

Scenarios

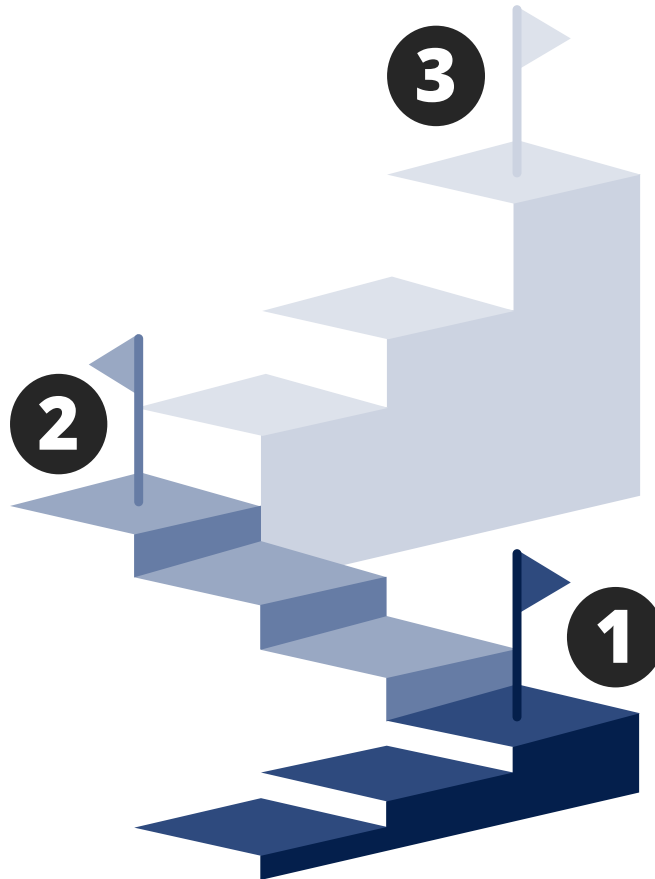
The most recognized climate scenarios

There are currently several recognized organizations that propose different models and scenarios for making climate change projections



IEA

- ❑ The IEA uses a WEM model to make projections that replicate the functioning of the energy market in different scenarios (WEO Scenarios).
- ❑ There are four scenarios where the outcome of the policies implemented for 2100 varies.



IPCC



- ❑ The AR5 Report: Climate Change (2014) uses RCPs.
- ❑ Its latest report (AR6 Climate Change, 2021) implements the use of SSP scenarios.
- ❑ The new scenarios represent different socio-economic developments, as well as different concentrations of greenhouse gases in the atmosphere.

NGFS



- ❑ Association of 66 central banks and supervisors with the objective of defining, promoting and contributing to the development of best practices on climate change and green finance.
- ❑ It was established in 2017 during the “One Planet Summit” in Paris.
- ❑ It has six scenarios with similar socio-economic assumptions.

The International Energy Agency (IEA) models four scenarios according to the policies and times at which they are implemented



Stated Policies

In the STEPS scenario, the announced policies and objectives are considered, but taking into account the measures that are being currently adopted to achieve their implementation. Unlike the Announced Pledges, mere commitment is not enough for a policy to be included, it does not assume that governments will achieve all announced climate targets.



Sustainable Development

Within this scenario, it seeks to achieve 3 sustainable development goals (SDGs):

- ☐ SDG 7: Affordable and clean energy.
- ☐ SDG 3.9: Reduce the number of deaths and illnesses caused by air pollution.
- ☐ SDG 13: Effective actions to combat climate change.

It is also based on increased clean-energy policies and investments that put the energy system on the path to the major SDGs. This scenario is consistent with limiting the global temperature rise to 1.65°C



Announced Pledges

This scenario envisages that all the climate commitments that governments have made will be met.

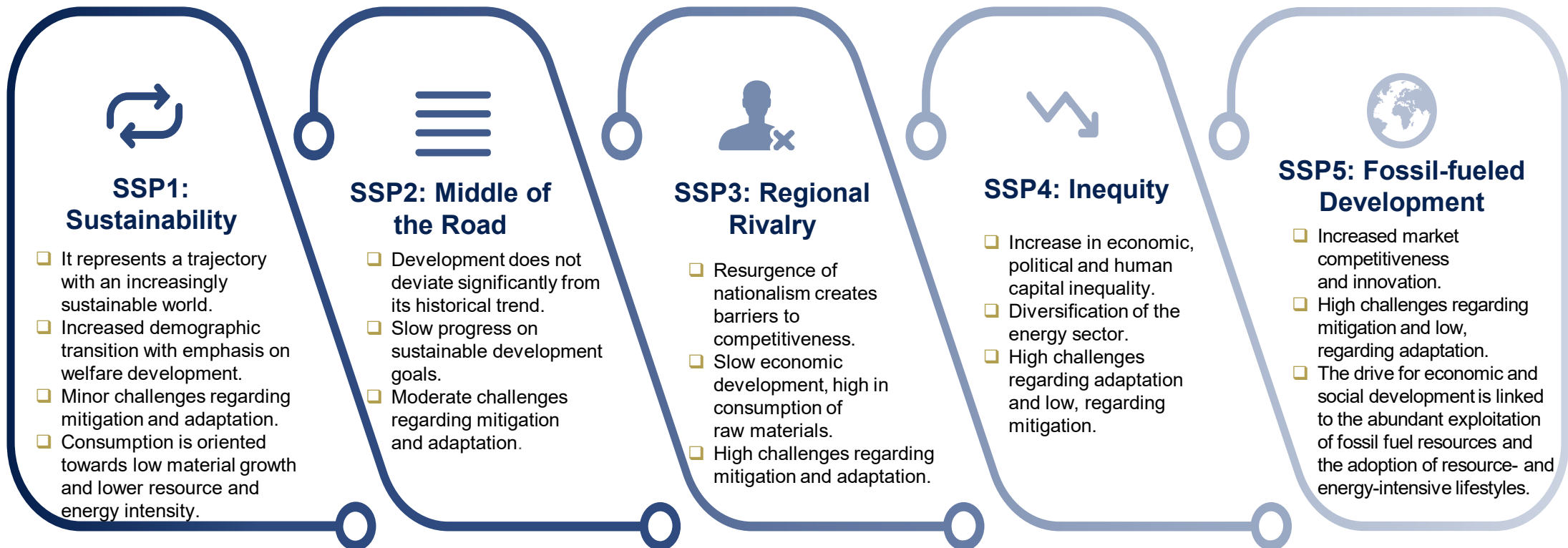
- It includes emission reduction targets for 2050.
- It includes 2030 and long-term target announcements.

Net Zero Emissions by 2050



Scenario in which zero net CO₂ emission by the energy sector is achieved in 2050. In particular, achieving universal access to energy by 2030 and significant improvements in air quality. This scenario is consistent with limiting the global temperature rise to 1.5°C without temperature overshoot. It shows a regulatory scenario of the path needed to achieve this goal.

IPCC presents five different SSP scenarios, varying the relationship between mitigation and adaptation challenges and covering physical and transition aspects



The NGFS has six different scenarios with similar socio-economic assumptions intended to cover a wide range of physical and transition risks



Net Zero 2050

- ✓ Limits global warming to 1.5°C.
- ✓ Strict policies and innovation achieve net zero CO₂ emissions by 2050.
- ✓ Low physical risks but high transition risks.



Below 2°C

- ✓ Strict policies are gradually increasing.
- ✓ 67% probability of maintaining temperature rise below 2° C.
- ✓ Relatively low physical and transition risks.



Nationally Determined Contributions

- ✓ It includes announced policies even though they have not been implemented.
- ✓ Temperature rise by about 2.5°C.
- ✓ Moderate to severe physical risks and low transition risks.



Divergent Net Zero



- ✓ This scenario reaches net zero in 2050 but with higher costs due to divergent policies and early elimination of fossil fuels.
- ✓ At least 50% probability of temperature rise below 1.5°C.
- ✓ High transition risk but lower physical risks.

Delayed Transition



- ✓ Assumption on new policies not introduced until 2030. Need for strong policies to maintain temperature rise below 2° C.
- ✓ Physical and transition risks higher than in “Net Zero 2050” and “Below 2°C” scenarios.

Current Policies



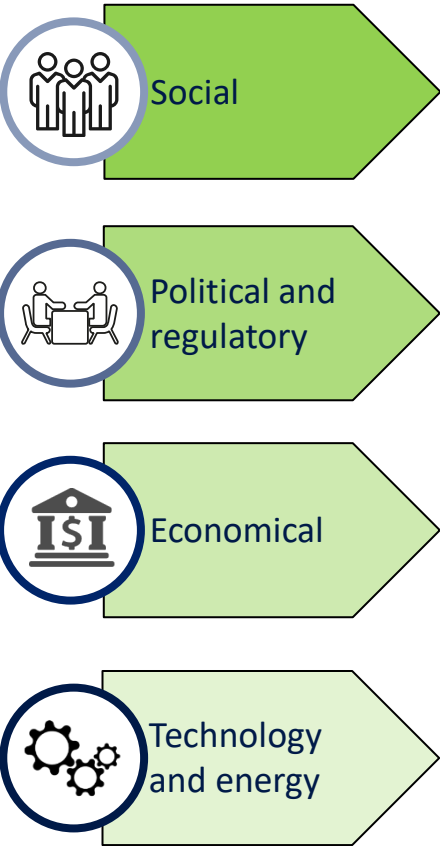
- ✓ It assumes that the current policies are kept. This creates high physical risks.
- ✓ Temperature rises by about 3°C and emissions rise up to 2080.

Climate scenarios

Specifications of climate scenarios

A combination of the IEA and IPCC scenarios was implemented as a source for obtaining complete climate scenarios by establishing 3 different scenarios adapted to Promigas

Main subjects of the scenarios



Selected scenarios

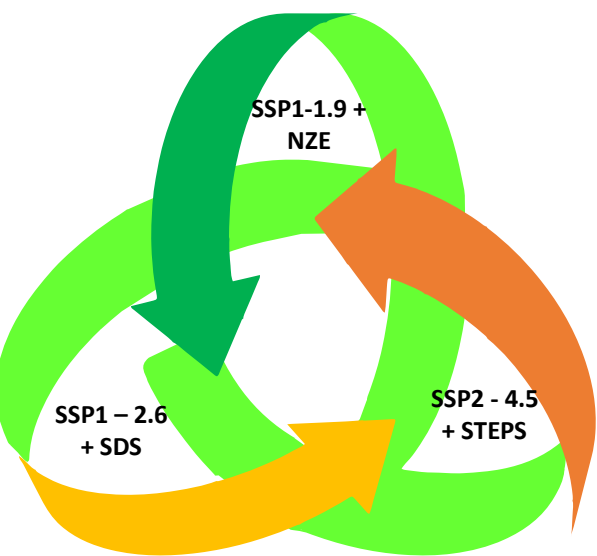


Note: If necessary, the data from the scenarios can be supplemented with information from NGFS.

Climate scenarios

Climate scenarios framework: General narratives

The 3 scenarios that served as the basis for the quantification of climate risks and opportunities are as follows:
SSP1 – 1.9 + NZE; **SSP1 – 2.6 + SDS**; **SSP2 – 4.5 + STEPS**



Accelerated
transition

This scenario considers that **the world energy sector will achieve zero net emissions in 2050, with global temperature rising no more than 1.5 °C. Zero net emissions are achieved in 2050** through major international effort and cooperation, with very high social involvement and the public sector working closely with the private sector and citizens. **There will be a rapid and decisive decline in the use of fossil fuels** and flourishing of low-emission industries. **The evolution of the energy sector will focus on a system based on renewable energies, electricity use and energy efficiency.** In this scenario, an unprecedented investment is expected **for the deployment of existing clean technologies**, especially solar and wind, and the development and evolution of new technologies such as hydrogen, batteries, electric vehicles, CCUs, among others. Finally, **economic growth will be high thanks to the use of sustainable energy sources** and the creation of millions of jobs linked to sustainability.



Moderate
transition

This scenario considers that **only developed economies will achieve zero net emissions by 2050, with temperature rising no more than 1.65° C.** Non-developed nations are expected to reach net zero emissions by 2070 through a major effort to create an energy system that is resilient to change and clean of emissions. **Technological investments will be made in the development of renewable energy (solar and wind) and fossil fuel substitutes (hydrogen, biogas, batteries, among others).** Economic growth will be accompanied by **a cleaner energy system, providing access to clean and sustainable energy solutions.** For this economic growth, a gradual decline in the use of fossil fuels and other polluting sources will be necessary, causing fossil fuel prices to fall, while CO₂ prices will rise.



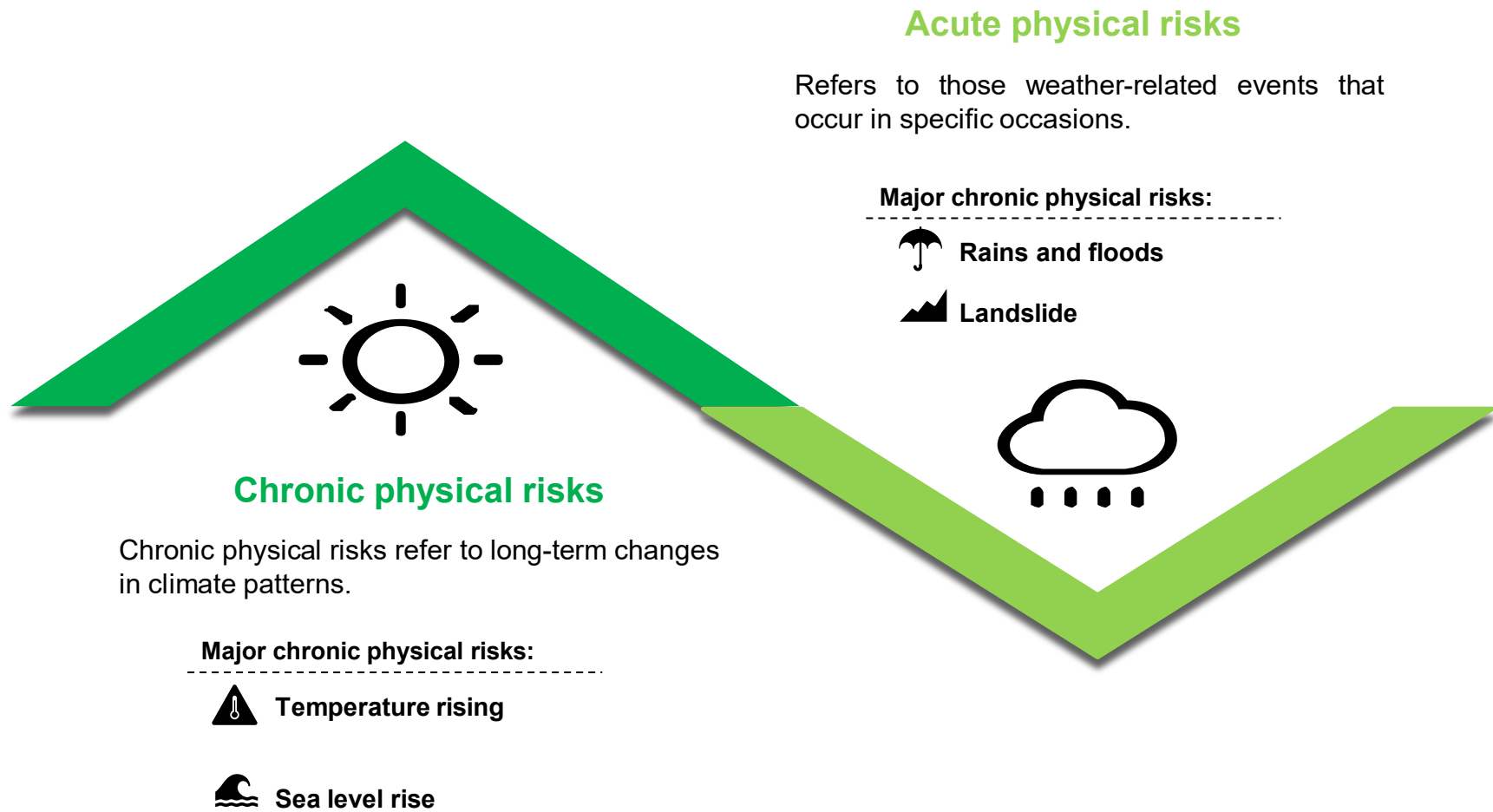
Slow
transition

This scenario considers that developed economies **will not achieve zero net emissions in 2050, with temperature rising no higher than 2.8°C.** It does not assume that governments will achieve all announced climate targets and tries to interpret where the energy system could go without a big push from political actors. Investments and policies will be targeted at the sectoral level of industries, including pricing policies, efficiency standards and schemes, electrification programs and specific infrastructure projects. Investments will also be made in technological development and renewable energy, but they will be conservative. All of this will lead to sustained economic growth by adopting economic policies to reduce the use of fossil fuels, but demand for fossil fuels will remain high.

Quantification parameters

Physical risks

According to TCFD, Promigas identified chronic and acute physical risks for the two different zones in Colombia



Note: Main risks and opportunities have been prioritized according to the economic impact they would represent for Promigas.

Quantification parameters

Quantification specifications



Quantification was carried out under the recommendation of TCFD by type of physical risk, climate scenario and time horizon

1 Aggregate view - time horizon

2 Climate scenario

3 Geography

4 Risk/Opportunity Type

2030			1
Accelerated Transition (SSP1 1.9+NZE)	Moderate Transition (SSP1 2.6+SDS)	Slow Transition (SSP2 4.5+STEPS)	
Colombia - Zone 1 and Zone 2	Colombia - Zone 1 and Zone 2	Colombia - Zone 1 and Zone 2	3
Risks/Opportunities Physical risks	Risks/Opportunities Physical risks	Risks/Opportunities Physical risks	4
Specification of companies by zones: Zone 1: Transoccidente, SPEC, Promigas, Promisol Zone 2: Promioriente y Transmetano	Specification of companies by zones: Zone 1: Transoccidente, SPEC, Promigas, Promisol Zone 2: Promioriente y Transmetano	Specification of companies by zones: Zone 1: Transoccidente, SPEC, Promigas, Promisol Zone 2: Promioriente y Transmetano	
2040			
Accelerated Transition (SSP1 1.9+NZE)	Moderate Transition (SSP1 2.6+SDS)	Slow Transition (SSP2 4.5+STEPS)	
2050			
Accelerated Transition (SSP1 1.9+NZE)	Moderate Transition (SSP1 2.6+SDS)	Slow Transition (SSP2 4.5+STEPS)	

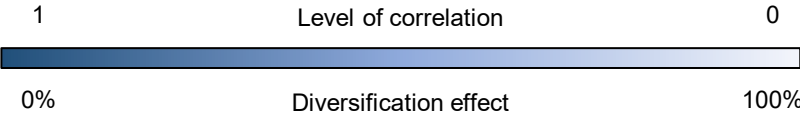
Quantification parameters

Risk correlation matrix



For aggregating risks it was necessary to define the correlations between the different risks; then, correlations within the different zones of Colombia were presented

Risks	Chronic physical risks	Acute physical risks	Transition risks – Political and legal	Transition risks – Market	Transition risks – Technology	Transition risks – Reputation
Chronic physical risks	0.75	0.5	-0.5	-0.25	-0.25	-0.25
Acute physical risks	0.5	0.75	-0.5	-0.25	-0.25	-0.25
Transition risks – Political and legal	-0.5	-0.5	0.75	0.5	0.5	0.5
Transition risks – Market	-0.25	-0.25	0.5	0.75	0.5	0.75
Transition risks – Technology	- 0.25	- 0.25	0.5	0.5	0.75	0.5
Transition risks – Reputation	- 0.25	- 0.25	0.5	0.75	0.5	0.75



Note: Correlations between equal risks are not covered in the matrix and are equal to 1.