Climate Emergency Case Study Template

Title: Developing a Strategic Adaptation Plan for Promigas Assets.
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Company represented: Promigas S.A E.S.P
Role: asset owner
Sector: utilities/*gas*
Asset owner: Promigas S.A E.S.P

Introduction

Description of assets in study

The assets included in the study were 2753 km of natural gas pipelines (steel and polyethylene), compressor stations and hydrogen plant. These assets are in the North region of Colombia, some of them are ageing asset.

When was the activity carried out?

The different activities carried out included climate change risk analysis, a prioritization plan and its execution. All the activities began in June 2023 until April 2024.

Why was the activity carried out?

Promigas transports 56% of the natural gas consumed in Colombia, it is considered a public service, with a positive impact in the quality of life of more than 4.3 million people. For the company is mandatory to guarantee a service with highest quality and continuity.

Promigas has been developing a roadmap to attend the climate change for the reduction of 50% of GHG emissions in Scopes 1 and 2 and a dedicated part of Scope 3 by 2028, and net zero emissions by 2040 based on 2021 emissions. Furthermore, the company has been working on improvement the assets adaptation and resilience to the climate change, considering that Colombia is particularly vulnerable by its geographic location.

Improving our decision-making process related to climate change will permit to prioritize our assets investment, considering cost, risk and performance, maximizing value.

Terminology

GHG: Greenhouse gas
ROW: right of way

Description of activity

Methodology

Promigas business strategy is aligned with innovation and climate change strategies to boost the objective of continuing to be sustainable. Through its actions, the company will be able to adapt to the changing nature of the industry and create value, contributing to reducing negative impacts on the environment. This understanding is a driver which contributes to work on guarantee our assets

resilience for long term, considering the risk and mitigation requirements. We also will strength our decision-making process, considering the best investment in the whole life of the asset.

The methodology included the following steps:

- References review in asset management and climate change.
- Identification of type of asset and location, which was included in the adaptation plan scope.
- Identification of the threatening events related to climate change.
- Calculation of the vulnerability and risk, considering that the vulnerability is resulting of sensibility and adaptation capability.
- Definition of the adaptation plan suggestions for short, medium and long term.

The vulnerability and risk were calculated considering the methodology proposed in the Colombia Government Documents "Plan Integral de Gestión del Cambio Climático" and "Tercera Comunicación Nacional de Cambio Climático", the last document was developed considering the *United Nations Framework Convention on Climate Change*.

References

- The Anatomy, IAM document.
- ICEP White paper: Climate Emergency Action Planning, The IAM.
- ISO 55001
- ASME B31.8S Managing System Integrity of Gas Pipelines
- Colombia Government Document "Plan Integral de Gestión del Cambio Climático/sector Minero Energético"
- Colombia Government Document "Tercera Comunicación Nacional de Cambio Climático"
- Colombia Government Document "Política Nacional de Adaptación al Cambio Climático"

Risk types

The risk types identified were business risk, reputational risk, service risk, environmental risk, availability and performance risk, maintenance risk.

Risk management process

Promigas has developed a quantitative risk model to analyse the 9 integrity threats consider in the ASME B31.8S standard and, furthermore, climate change. This quantitative risk assessment (QRA) was complemented with a climate change qualitative risk assessment, developed in this study, improving the risk estimation. Both are fundamental for managing and mitigating the impact of the major inherent risk identified for the Promigas assets.

The risk assessment has a strong relationship with the asset management planning, it provides an understanding of the risk and offers specific action plans for asset risk mitigation, which improves the decision-making process and investment prioritization.

Tools used and resources used.

The resources considered in this case study were described previously in the reference. To analyse the five threatening events associated with climate change were used a digital cartographic information, with forecasting until 2040. The websites consulted were, among others, Institute of Asset Management, Colombia Ministry of Environment and Colombia Ministry of Mines and Energy.

Metrics

The vulnerability, threat and risk associated with climate change have been measured according to the following scale: very low, low, moderate, high and very high. These were the scale considered in the reference used, specifically in the Colombia Government Document “Plan Integral de Gestión del Cambio Climático/sector Minero Energético”.

People

In this case study were involved 4 people.

Evaluation

What was the main output of the activity?

The assets analysed were pipelines, compressor stations, and hydrogen plant. The methodology applied, as described previously, considered 5 threatening events related to climate change: soil movement, rises in the sea, fires, flooding and storms and hurricanes. For these threatening events were analysed the level of vulnerability and risk, the vulnerability as results of sensibility and adaptation capacity and the risk as results of vulnerability and threat level caused by the threatening events.

The outputs are described as follows:

- Vulnerability: the vulnerability levels were estimated as low and moderate. The threatening events identified as moderate level were rises in the sea and fires for all the assets analysed.
- Threat level: the threat levels were estimated as very low, moderate, high and very high. The event with highest level of threatening (very high) is soil movement, followed by fires (high) and rises in the sea (moderate) for all the assets analysed. The last one is specific for assets located up to 2 km since the seacoast.
- Risk: the risks were estimated as low, moderate and high. The threatening event identified as high level was soil movement, followed by fires (moderate to high), and rises in the sea (moderate) for all the assets analysed. Even storm and hurricanes and flooding were considered low, it is important to consider that phenomena such as “La Niña”, which produces an increase in rain, can affect the river behaviour, increasing the assets risk.

To guarantee asset resilience to climate change, specific actions were developed according to the risk assessment. This adaptation strategy met Promigas decarbonization strategy (net zero emissions by 2040 based on 2021 emissions), Colombia Climate Strategy 2050 and Colombia Government Document “Plan Integral de Gestión del Cambio Climático/sector Minero Energético”. The adaptation strategy for the assets is described as follows:

- Promigas strategic assets adaptation plan is going to be used to define a prioritised investment plan, which attends the assets with the highest risk and specific actions for mitigation. For example, investment in protection of the assets with coastal erosion risk, actions related to protection of riverbank, among others.
- It was designed a weighting criterion for prioritizing adaptation measures, with the following criteria: climate risk assessment, alignment with the Promigas strategy, technical viability, number of assets affected by the adaptation measures and reduction of greenhouse gas emissions.
- It was designed a standard report for the asset adaptation action, considering each threatening event. This report included the actions recommended in short, medium and long term, KPI’s and benefits. Some of the actions considered are showed below:

Threatening event	Actions
Flooding	Engineering designs for rivers, friendly with the environment
Soil movement	Reforestation
Fires	Prevention actions and response
Rises of the sea	Engineering designs for seacoast, friendly with the environment
Storms and hurricanes	Use of ecosystems to protect the seacoast, for example, mangroves

- To mitigate the impact produced by the weather pattern “El Niño”, related to the threatening event fires, it was defined an action plan, which included the following: according with the cartographic charts developed in the case study, it was prioritised the assets with highest risk related to fires. For those assets were implemented a special maintenance plan, which included, the use of firewall where the asset was above ground, patrol of the ROW to identify early warning, among others.
- To mitigate the impact produced by the weather pattern “La Niña”, related to the threatening event flooding, it was defined an action plan, which included the following: according with the cartographic charts developed in the case study, it was prioritised the assets with highest risk related to flooding. For those assets were implemented a special maintenance plan, which included, patrol of the ROW to identify early warning, solution engineering design and its implementation in the field, weekly executive report to the senior teamshowing a follow-up of the mitigation plans, among others.
- It was stablished KPI´s for monitoring and assessment of the effectiveness of the adaptation plan.

Outcome

The activity developed was successful because permitted to understand the vulnerability and risk for the Promigas assets, considering 5 different threatening events. The results were used in 2024 to define action plans to guarantee assets resilience under weather patterns as “La Niña” and “El Niño”, considering that both have an increase in frequency and intensity by climate change.

Our climate change risk understanding has been improved with this study, focalizing the efforts in the assets with highest risk, considering cost, risk and performance.

Lessons learned and challenges.

Lessons learned

The climate adaptation plan permitted to improve our decision-making process. Previously to this study some decisions in our assets, related to climate change, were based on experts’ judgment and engineering studies, now we can consider other criteria to understand the inherent risk.

Challenges

Although for this study considered the conceptual IAM asset management model, as proposed in the IAM reference document “ICEP White paper: Climate Emergency Action Planning”, it is necessary to reflect with more emphasis, in the adaptation plan update, a clear development of the activities included in the IAM group of themes. For the climate risk assessment will be consider a quantitative risk model, based on Montecarlo method, which will permit to estimate the value risk for the company. Promigas will update this study, beginning in the fourth quarter of 2024.