2025 CLIMATE CHANGE ADAPTATION PLAN

Contents

1. INTRODUCTION

Recognizing the urgency of the climate crisis, Cemig positions adaptation to climate change as a fundamental pillar of its strategy. By creating a comprehensive and innovative Adaptation Plan, the Company seeks to bring together in a single document the resilience actions needed to address climate issues, allowing the company to adapt to market changes and new customer demands.

The plan details strategic initiatives by business segment, with impact analyses and measures to mitigate them. In addition, it defines new actions to be implemented by 2026. **The plans presented in this report cover 100% of our current and planned operations and should be implemented over the next 5 years.**

One of the premises adopted in the development of this plan was the analysis of the materiality of the main physical risks and impacts that may affect the Company's business, as well as the identification and characterization of adaptive measures and the prioritization of these measures. The prioritization of adaptive actions considers the following variables: cost-benefit of the action, urgency, response time, flexibility and barriers.

We consider the Climate Plan ("Plano Clima" in Portuguese, under development) as an instrument for analyzing and identifying climate events, risks, impacts and adaptation or mitigation actions. According to the Climate Plan, the main climate threats associated with the energy sector are:

I. Increased frequency and duration of droughts;
II. Increased extreme and persistent rainfall;
III. Catastrophic winds or hydrological flows;
IV. Increased frequency of heat waves;
V. Increased incidence of atmospheric discharges;
VI. Increased incidence of landslides.

Based on the risks identified in the Climate Plan and the monitoring of risks faced by Cemig in recent years, an analysis of climate events and their impacts on the company's business was carried out.

The methodology for analyzing risks and actions to adapt to climate change considers the following topics:

I. Analysis of climate events and scenarios:
   - Short-term studies;
   - Long-term analysis of climate event projections.

II. Risk identification:
   - After analyzing climate events, the risks/impacts that affect assets/businesses are identified.

III. Vulnerability assessment:
   - Identification of the most exposed websites/businesses

IV. Prioritization:
   - Prioritization of adaptation actions related to the main risks identified

V. Investments:
   - Investments in adaptation, prevention and resilience using innovative technologies.

2. ANALYSIS OF EXTREME WEATHER EVENTS

In this section, the analysis of extreme weather events was explored, analyzing variables and phenomena that are directly related to these events, with a focus on temperature data, fires, lightning, wind gusts and intense precipitation. These analyses were restricted to the state of Minas Gerais, where the company's main activities are located, and for comparison purposes, some data related to previous years will be presented.

By analyzing these variables and phenomena together, a more complete and accurate picture of extreme weather events can be obtained. While the previous sections focused on mean fields as well as monthly precipitation totals, this section will focus on intense, short-lived events that are often masked by mean fields.

2.1 Precipitation

In Figure 1, we have the total occurrences of accumulated precipitation in 24 hours, calculated from data from automatic meteorological stations of the National Institute of Meteorology (INMET) between 2017 and 2024. Each daily occurrence, from each station, is added up, according to its range.

As there was a decrease in accumulated rainfall in part of the state in 2024, but an increase in the northern strip, several meteorological stations recorded an increase in the occurrences of intense rainfall in 2024, mainly due to the increase in the number of extreme events associated with the South Atlantic convergence zone (ZCAS). The graphs below show that, between 2023 and 2024, there was an increase in the number of occurrences of these intense rainfalls in all precipitation bands.

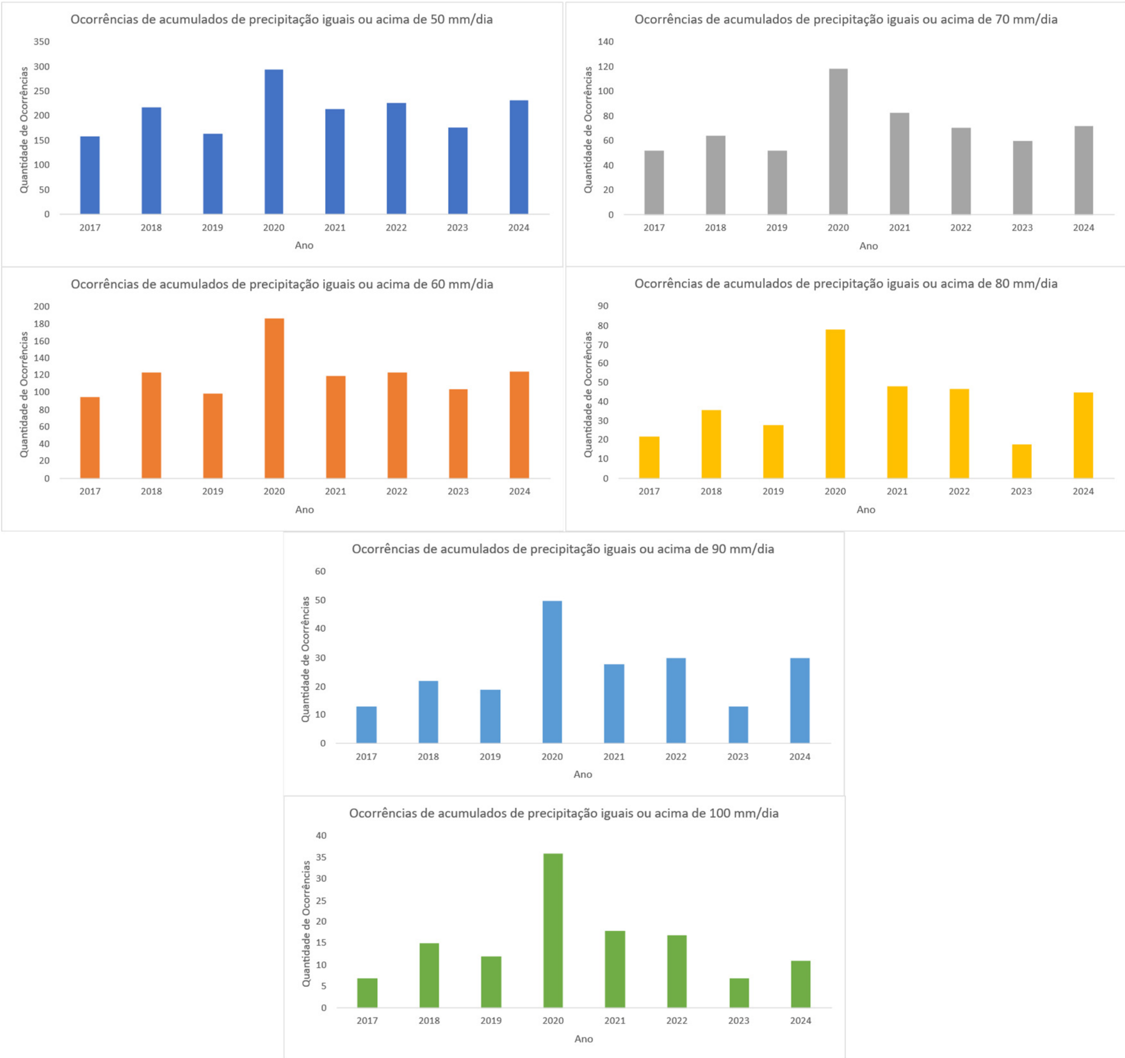


Figure 1 – Number of occurrences for different daily precipitation ranges.
Source: Adapted by Cemig from INMET data.

2.2 Wind gusts

With the increase in the number of extreme events in the ZCAS, it was also expected that the decrease in temperature associated with the increase in cloud cover would cause a decrease in severe storms, as there would be less heat available in the atmospheric layer. This effect becomes clear in the analysis of wind gusts and the number of atmospheric electrical discharges, which decreased considerably, as shown below.

In Figure 2, we have the same analysis performed for precipitation, but now focusing on the ranges of significant wind gust events. In this case, all days in which each of the weather stations recorded wind gusts above a certain value were counted, in order to obtain information on both the scope and the extent of significant strong wind events in each year.

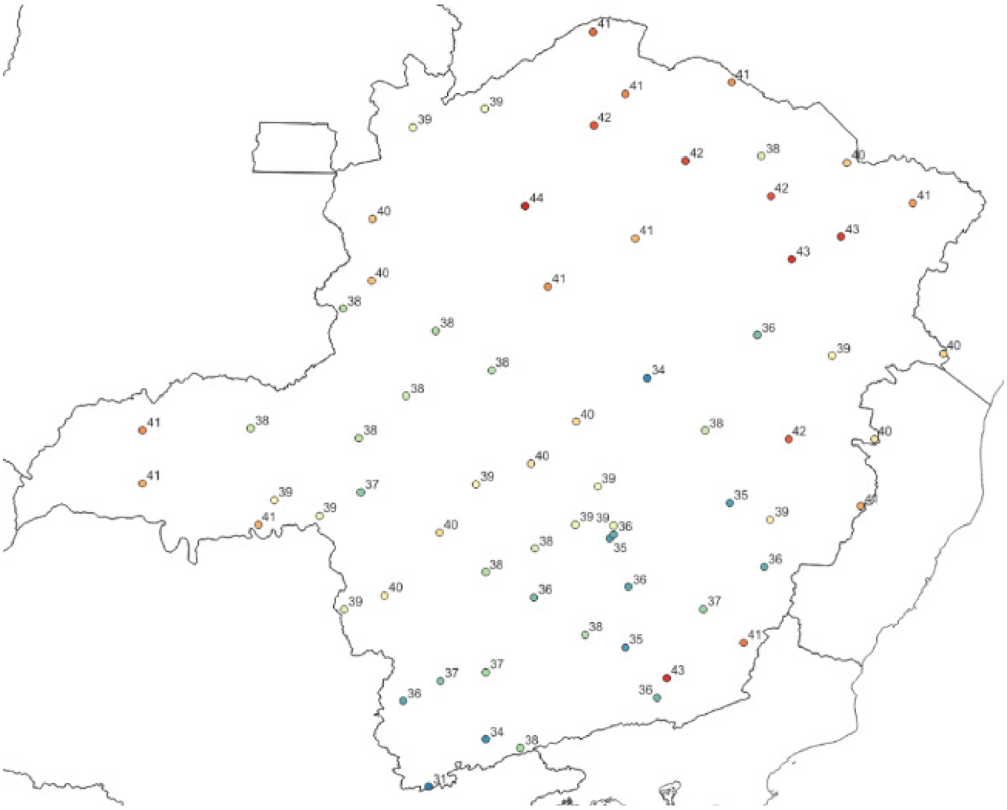
Since 2021, there has been a substantial increase in the frequency of occurrence of strong wind gusts, which is evident in the graph in this figure, where there was an increase in all magnitude ranges of wind gusts analyzed, until 2023. In 2024, due to a greater number of extreme events in the ZCAS, which leads to lower temperatures during its operation, the number of events decreased, as expected.

Wind gust frequency graphs

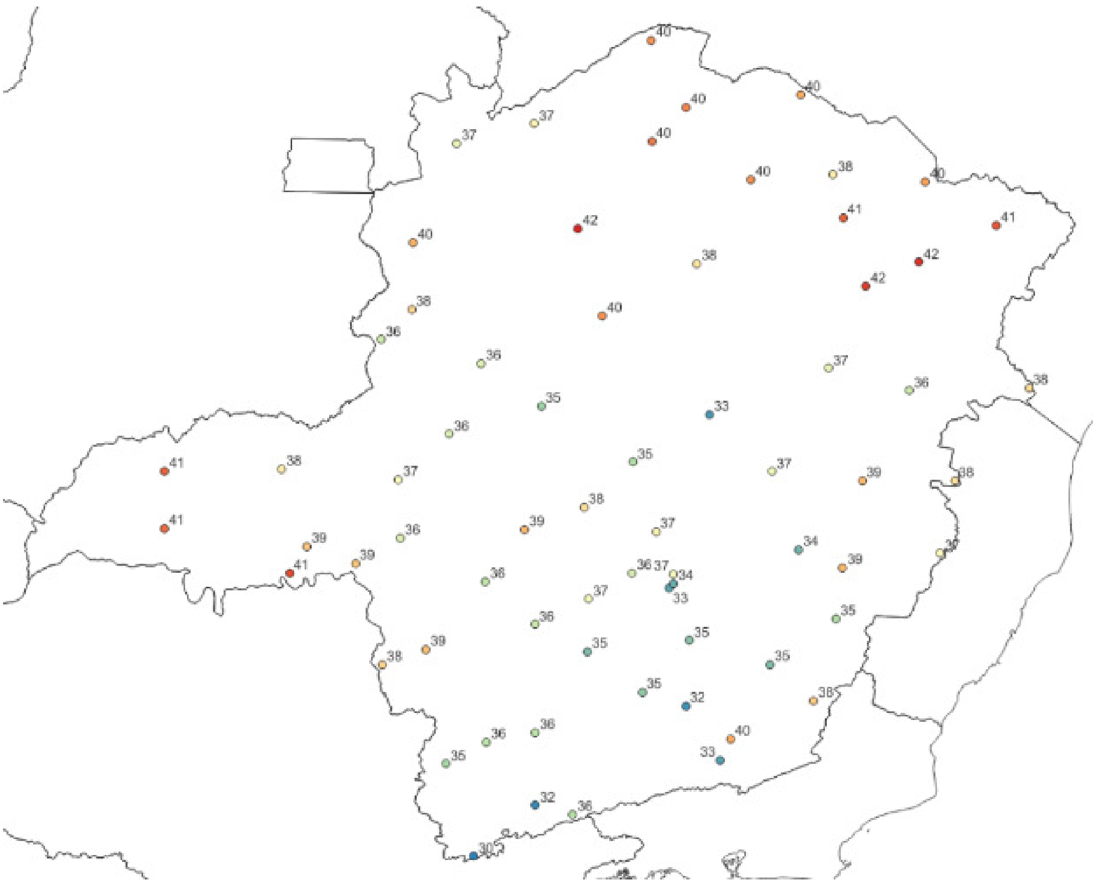
Figure 2 – Number of occurrences for different maximum daily gust values.
Source: Adapted by Cemig from INMET data.

2.3 Temperature

Figure 3 shows the absolute maximum temperature values recorded in 2023 and 2024, as well as the difference between them, obtained from data from INMET stations. These records show that several stations, especially in the North and Triângulo Mineiro, presented values above 40°C, and that a considerable number of the others approached this value. However, in 2024 there were no intense heat waves that were recorded in 2023, as well as the greater frequency of ZCAS episodes, which contributed to a decrease in temperatures.



(a)



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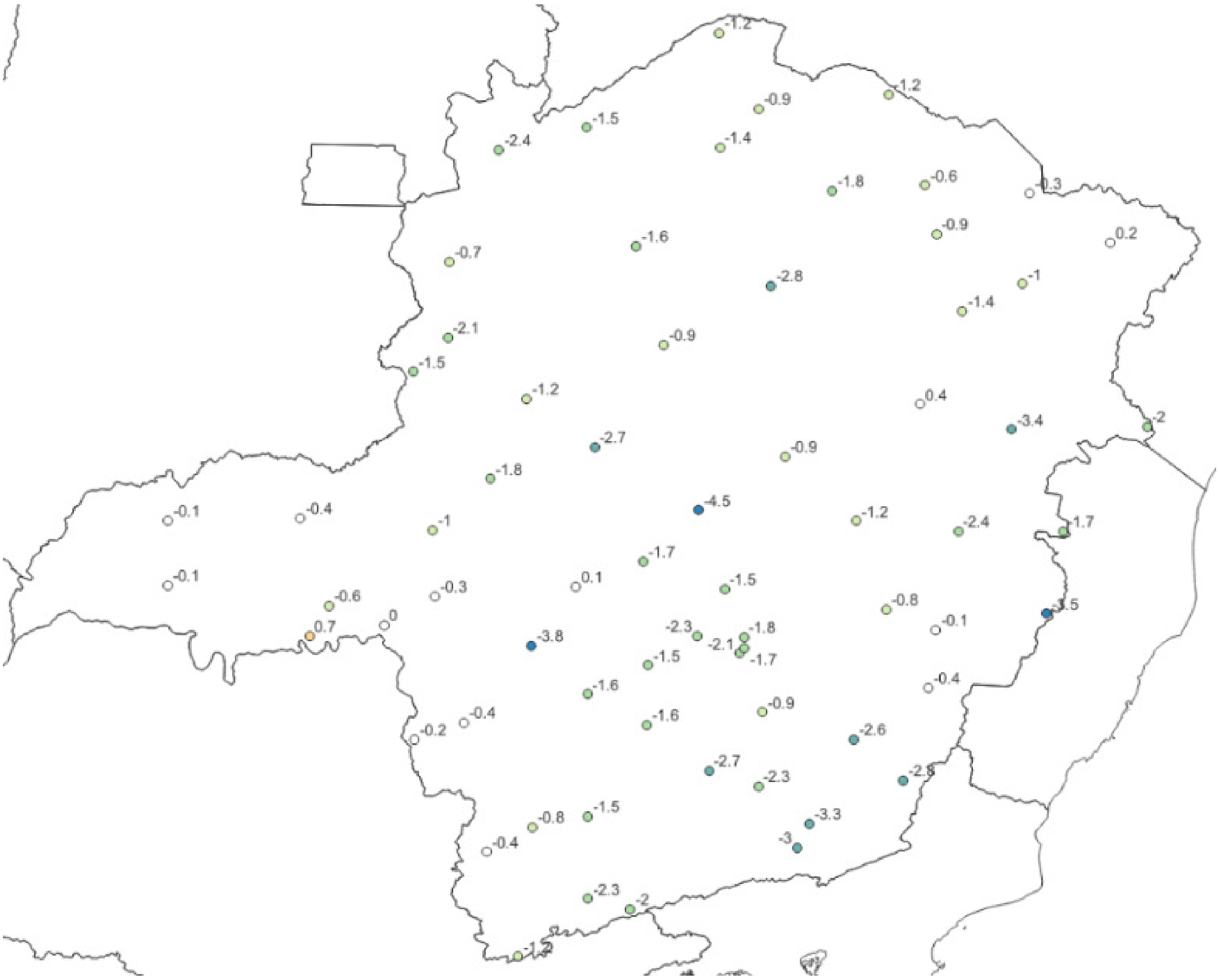


(c)

Figure 3 - Absolute maximum temperature (°C) recorded in 2023 (a), 2024 (b) and the difference between the two years (c). Source: INMET.

2.4 Lightning

Another excellent indicator of the increase in extreme weather events is the large increase in lightning detected by the National Integrated Network of Atmospheric Discharges (RINDAT), which in 2023 presented a quantity much higher than that recorded in 2022. For 2024, the greater volumes of rain and the decrease in temperature led to a smaller number of lightning strikes, as can be seen by comparing the data in Figure 4 and Figure 5. In this map, a decrease can be seen in almost all regions, but with emphasis on the Triângulo Mineiro and Zona da Mata, regions that concentrate the majority of the population of Minas.

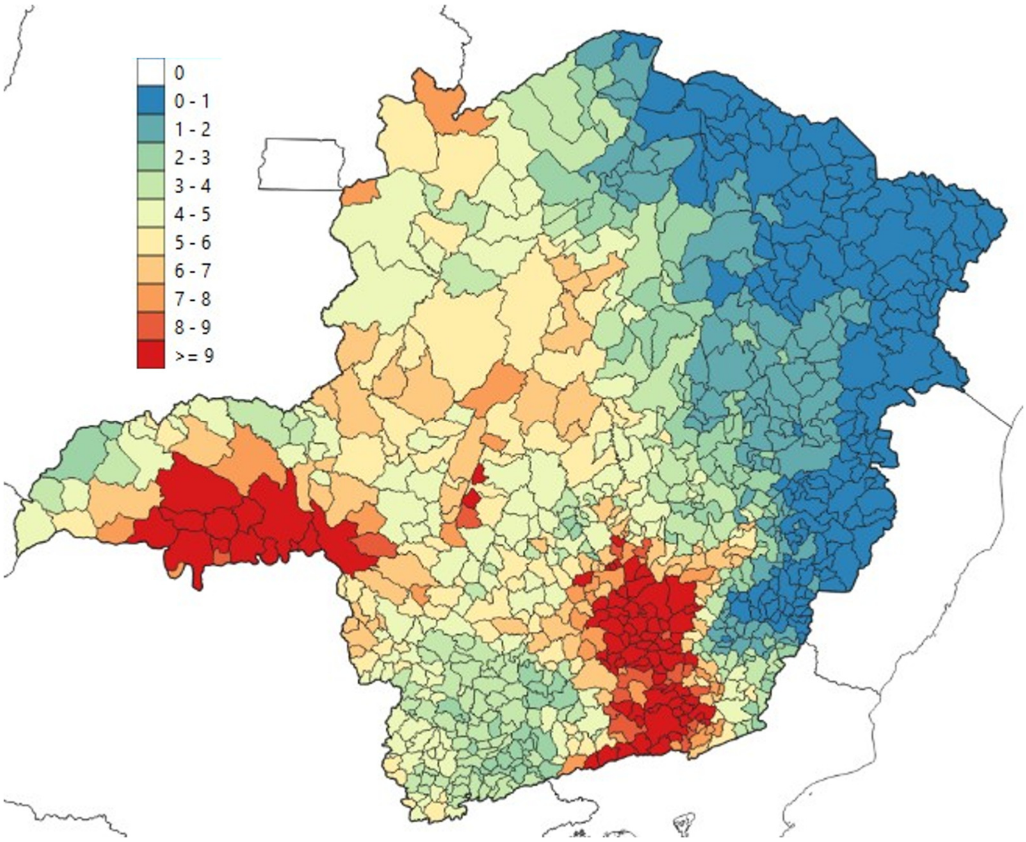


Figure 4 – Lightning density (Lightning/km²) by municipality in 2023. Source: RINDAT.

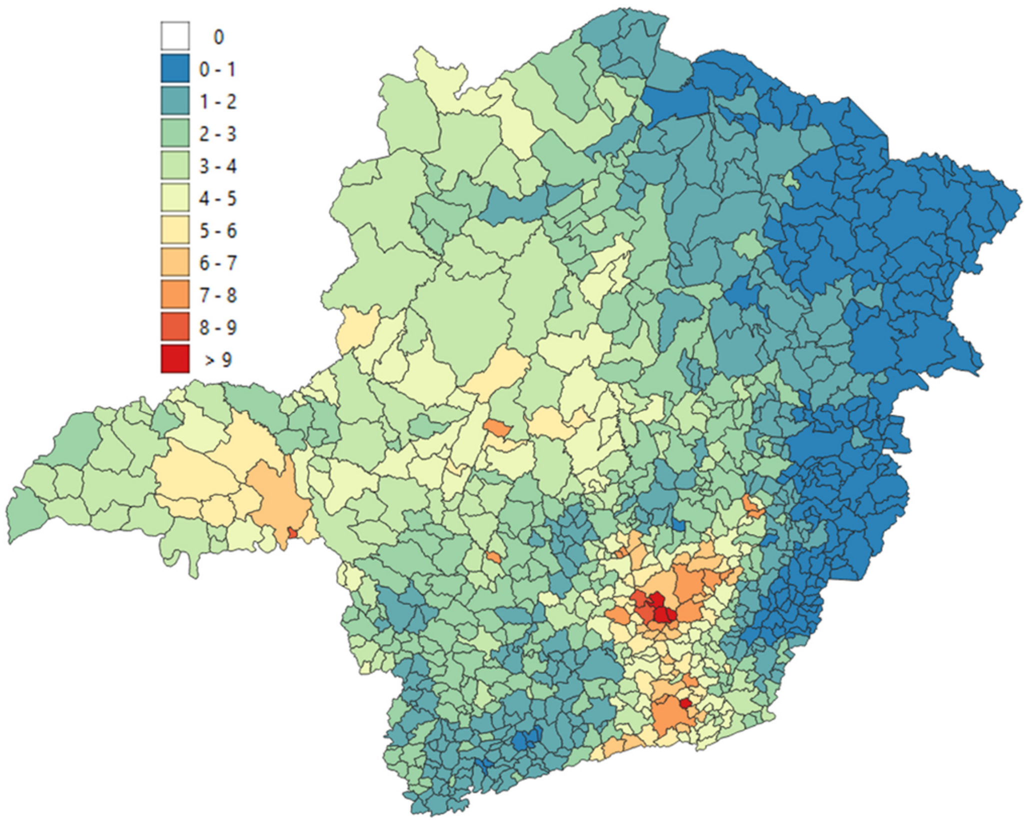


Figure 5 – Discharge density (Lightning/km²) by municipality in 2024. Source: RINDAT.

2.5 Fires

Two data sources were used to analyze the fires that occurred in the state. The first was the data provided by the Fire Information for Resource Management System (FIRMS), a system developed by NASA that provides data on heat sources obtained by radiometers on board satellites, enabling the identification and location of possible fires. The second source refers to data on fire sources detected for Brazil (INPE, 2024).

The year 2024 presented a total number of fire outbreaks for the state above the average, which is 10,005. According to data from INPE, 11,787 fire outbreaks were identified in 2024. Figure 6 shows the annual totals of fire outbreaks detected in Minas Gerais, according to INPE, highlighting the minimum (green bar) and maximum (red bar) ever recorded in Minas.

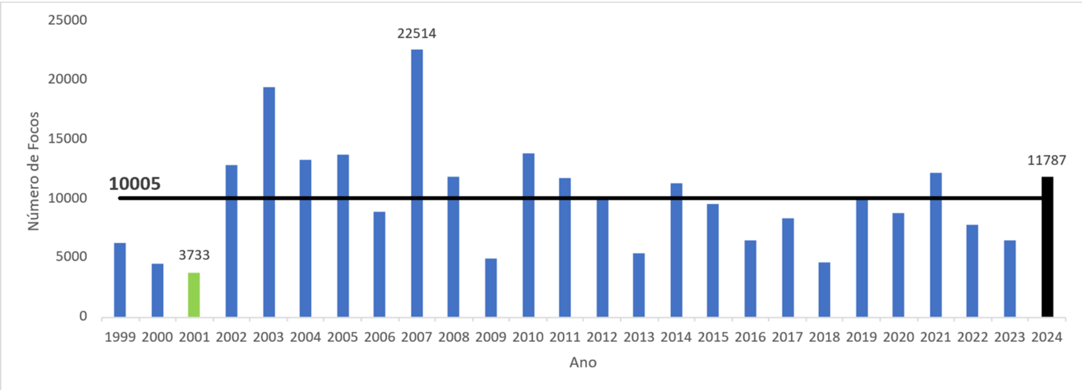


Figure 6 - Annual Total of Fires in Minas Gerais. Source: INPE.

Figure 7 shows the heat sources detected up to 500 meters from Cemig's main transmission and distribution lines, totaling 14,653. It should be noted that these sources are all those detected by satellites, without distinction of reference to specific fires, that is, the same fire may have been detected by more than one satellite.

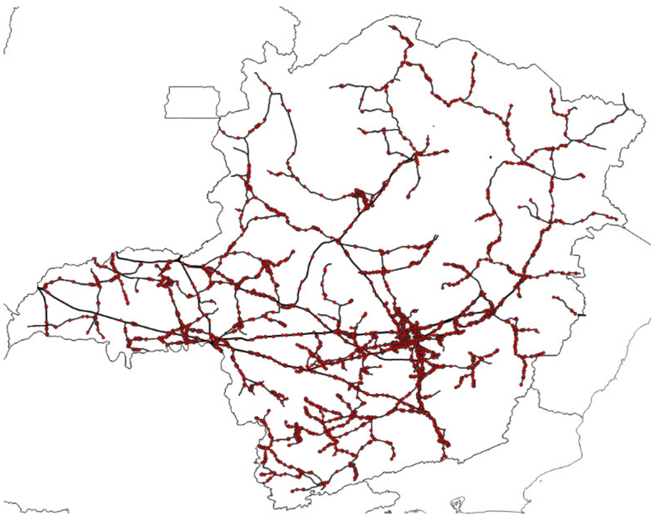


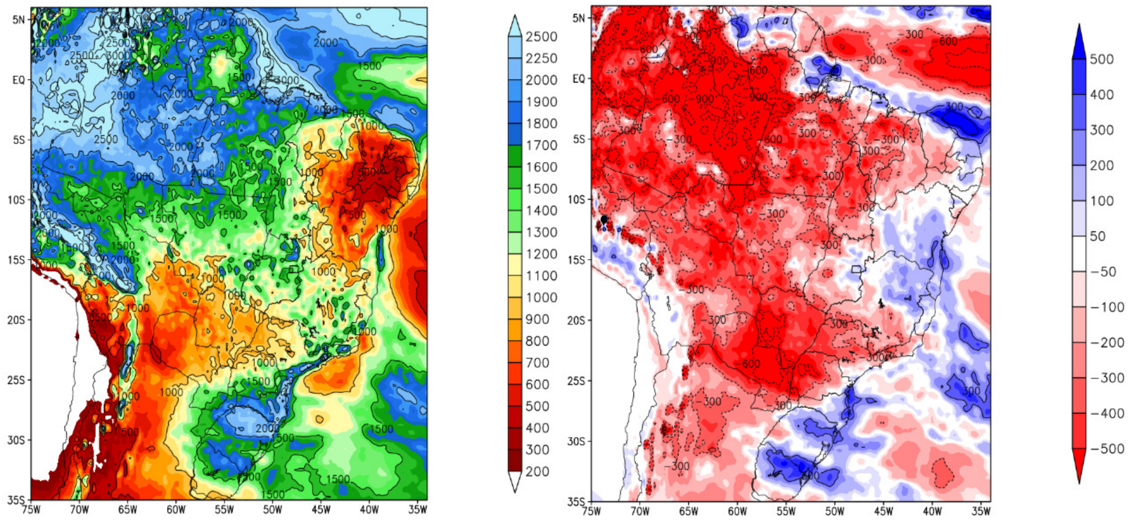
Figure 7 - Hot spots detected up to 500 meters from Cemig's main lines in 2024.
Source: NASA, adapted by Cemig.

3. ANNUAL ANALYSIS

This section will explore the behavior of the main meteorological variables throughout the year 2024, with the aim of providing an overview of the climate trends and patterns that marked this period. Each of the variables will be examined within an annual context, allowing the identification of any notable anomalies that may have occurred.

3.1 Precipitation

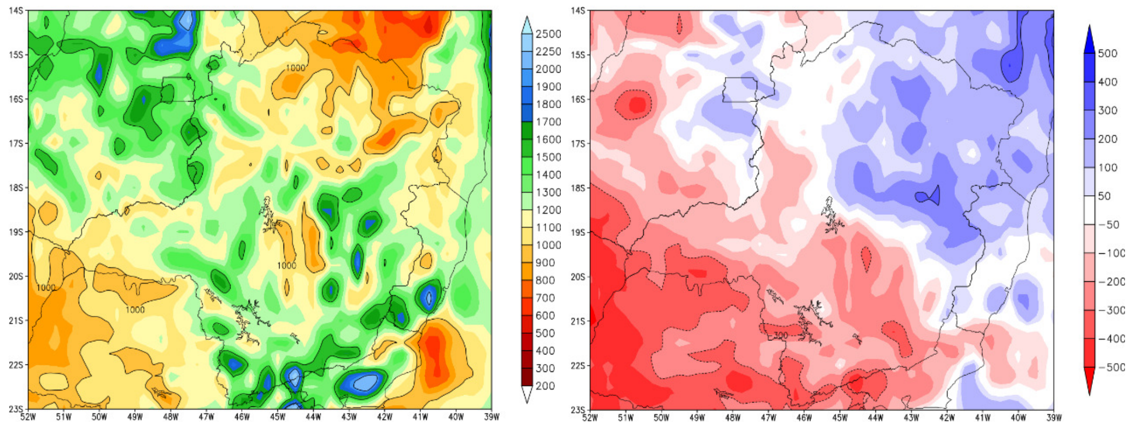
The map in Figure 8 clearly shows how much lower the precipitation was below what normally occurs annually, with extremely negative anomalies dominating the North and much of the Southeast and Central-West. The most significant positive anomalies were restricted to the states of Rio Grande do Sul and Santa Catarina, which led to several episodes of flooding in these states and, to a lesser extent, in the north of Minas Gerais, the state of Bahia and the east and north of the Northeast.



(a) (b)

Figure 8 - Total precipitation (a) and Precipitation Anomaly (b), in mm, in 2024. Source: ERA5.

In Minas Gerais, two opposite behaviors occurred: while in the north and east of the state, rainfall was well above average, in the central-southern sector, rainfall was below average. Some of these deviations revealed a deficit of over 300 mm in the South and Triângulo Mineiro, while in the North the same 300 mm occurred, but positive.

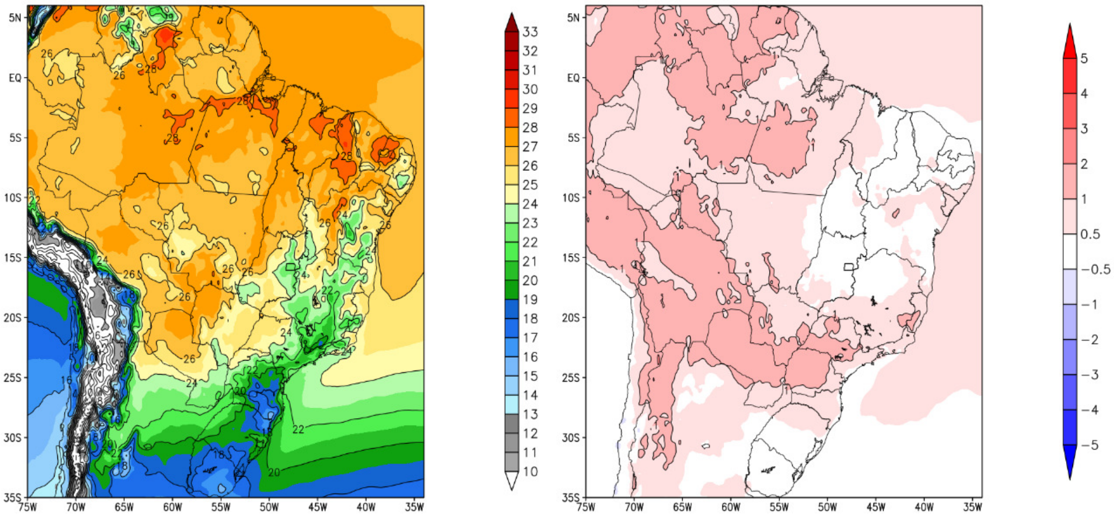


(a) (b)

Figure 9 - Total precipitation (a) and Precipitation Anomaly (b), in mm, in 2024, focusing on Minas Gerais. Source: ERA5.

3.2 Temperature

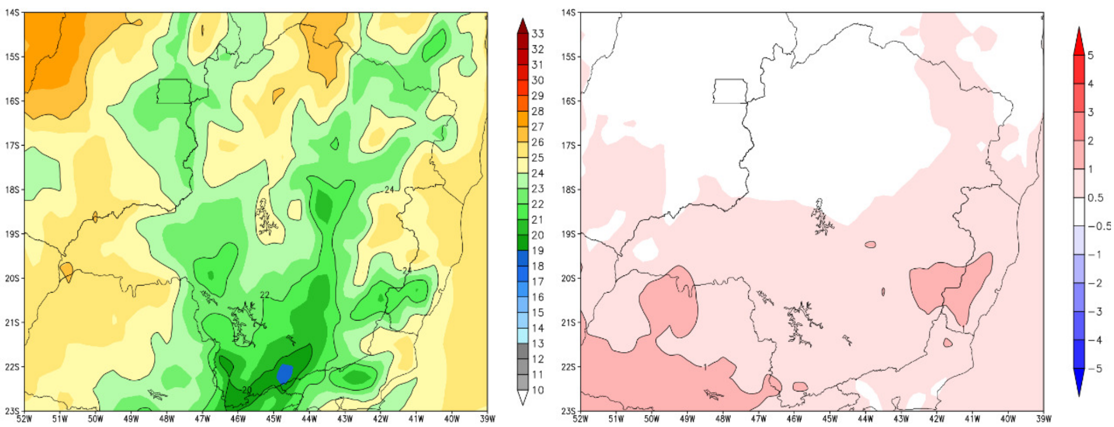
Regarding the average annual temperature, the entire country had temperatures above the historical average, resulting in intense heat waves, but less than last year. Although the highest average temperatures occurred in the North and Northeast, as expected, the largest positive deviations occurred in the North and between the South and Southeast regions, reaching values above 1°C.



(a) (b)

Figure 10 - Mean Air Temperature (°C) (a) and Mean Temperature Anomaly (°) (b) of 2024. Source: ERA5.

In Minas Gerais, only the northern sector of the state showed temperatures close to average, while the rest were slightly above average, with the biggest deviations occurring on the border with Espírito Santo, exceeding 1°C above the historical average.

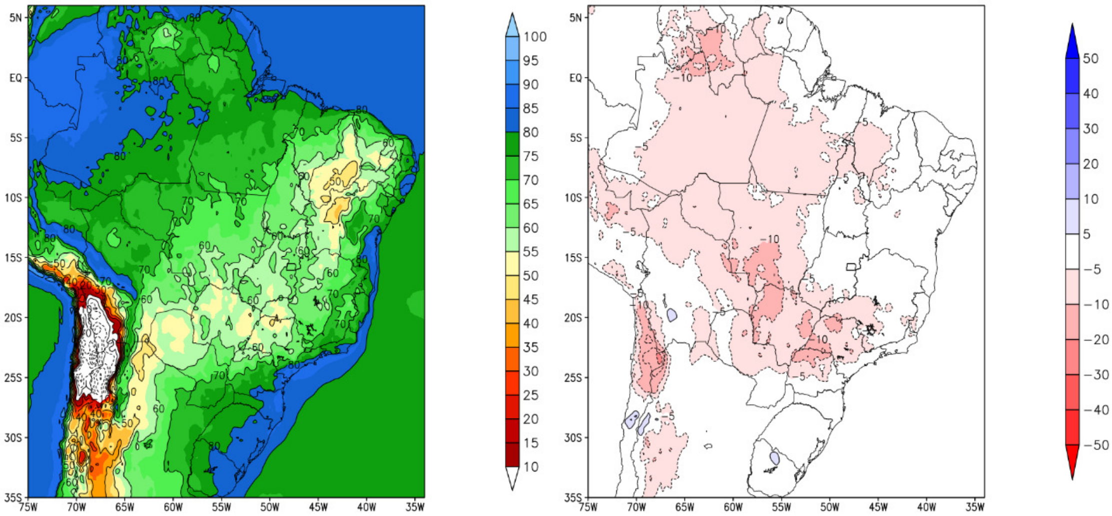


(a) (b)

Figure 12 - Average Air Temperature (°C) (a) and Average Temperature Anomaly (°) (b) of 2024, focusing on Minas Gerais. Source: ERA5.

3.3 Humidity

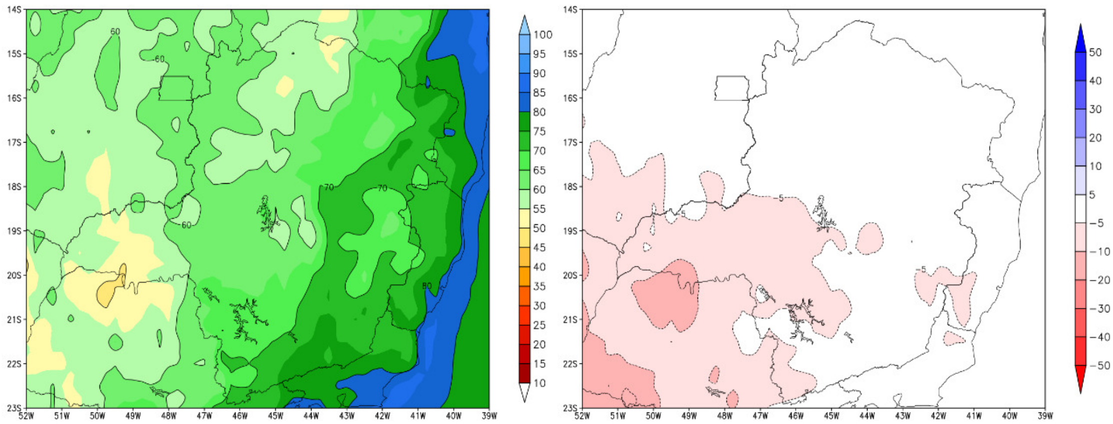
The relative humidity of the air also showed negative deviations, although with less expressive values, but even so, large areas of all regions presented these anomalies, with emphasis on the Center-West and the extreme north.



(a) (b)

Figure 3 - Average Relative Humidity (%) (a) and Average Relative Humidity Anomaly (%) (b) of 2024. Source: ERA5

The relative humidity in Minas Gerais was within the average, with the largest negative deviations occurring in the Triângulo Mineiro and part of the South of Minas.

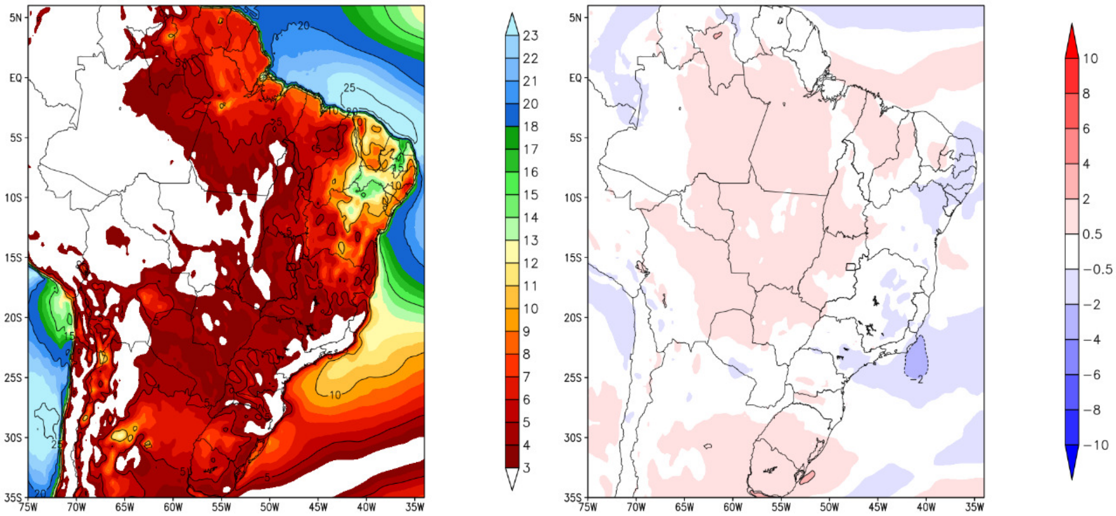


(a) (b)

Figure 13 - Average Relative Humidity (%) (a) and Average Relative Humidity Anomaly (%) (b) of 2024, focusing on Minas Gerais. Source: ERA5.

3.4 Wind

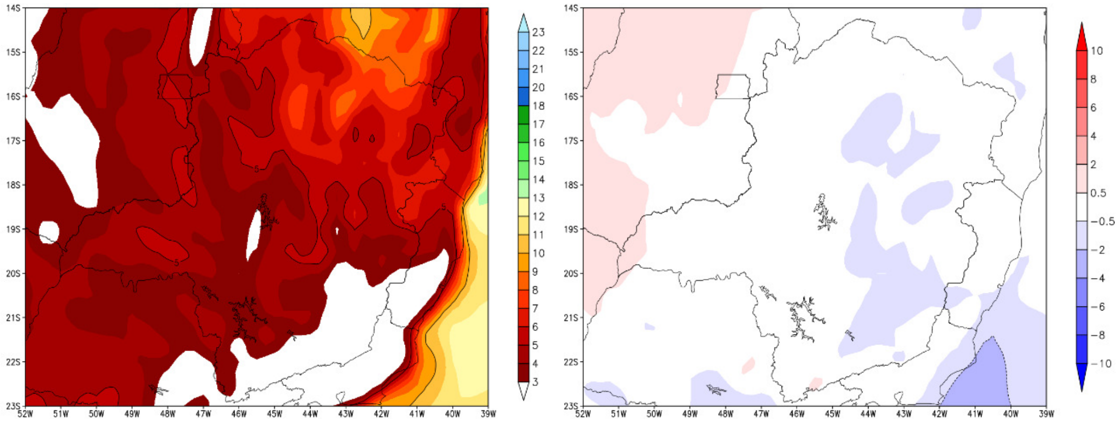
In an annual context, wind speed deviations were milder, with positive anomalies dominating the west of the country, where values are lower, while in the east of the Northeast and part of the Southeast negative deviations occurred.



(a) (b)

Figure 4 - Wind Speed (Km/h) (a) and Wind Speed Anomaly (Km/h) (b) in 2024. Source: ERA5

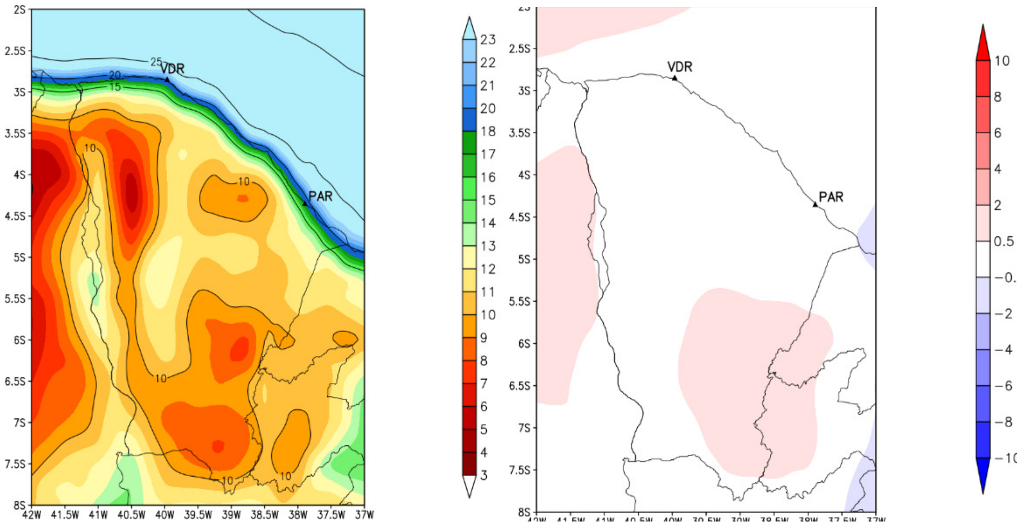
In Minas Gerais, winds are normally weak, when compared to those in the Northeast, and, in 2024, annual values showed slightly negative deviations in the eastern sector of the state, remaining within the average in most regions.



(a) (b)

Figure 15 - Wind Speed (Km/h) (a) and Wind Speed Anomaly (Km/h) (b) in 2024, focusing on Minas Gerais. Source: ERA5.

In Ceará, in an annual context, winds remained within the historical average, although the months showed alternation between positive and negative anomalies. Cemig's wind farms followed this pattern and remained within the average in 2024.

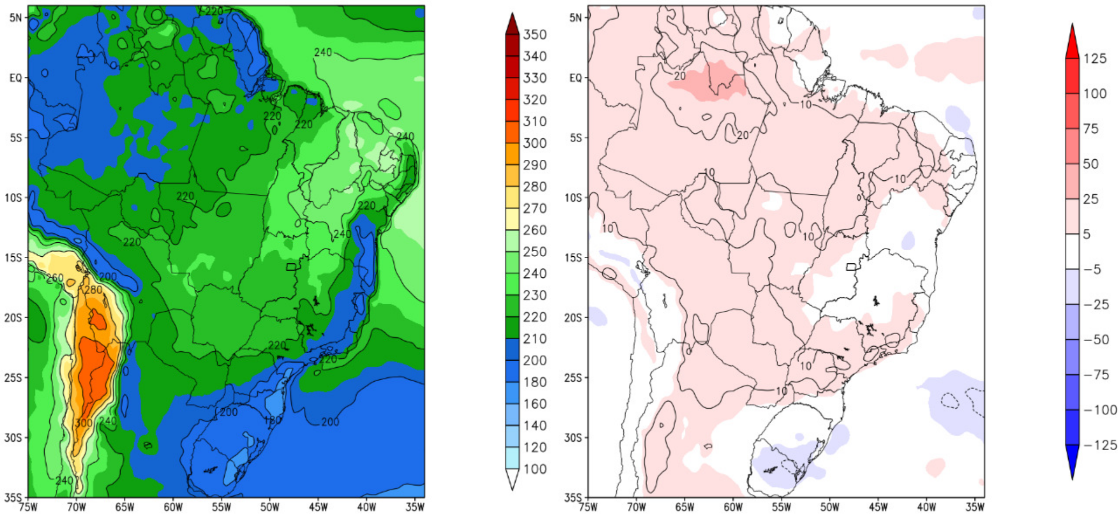


(a) (b)

Figura 56 - Wind Speed (Km/h) (a) and Wind Speed Anomaly (Km/h) (b) in 2024, focusing on Ceará. Source: ERA5.

3.5 Radiation

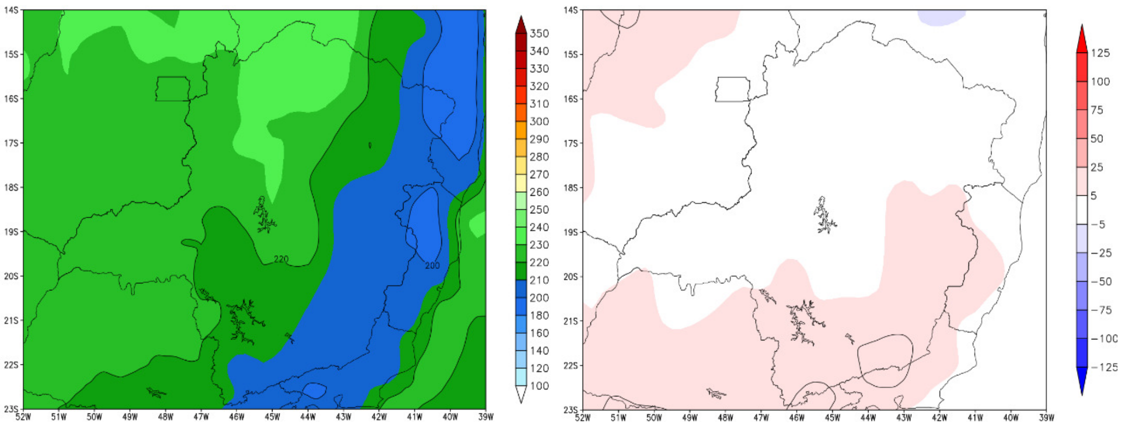
In terms of shortwave radiation at the surface, the entire country, with the exception of the extreme south, showed positive deviations. However, this year, there were no significant deviations, maintaining a consistent but not very expressive pattern.



(a) (b)

Figure 17 - Surface Shortwave Radiation (W/m2) (a) and Surface Shortwave Radiation Anomaly (W/m²) (b) in 2024. Source: ERA5.

Minas Gerais presented values above the historical average in the south and east of the state, while in the other regions the values were within the historical average.



(a) (b)

Figure 18 - Shortwave radiation at the surface (W/m²) (a) and Shortwave radiation anomaly at the surface (W/m²) (b) in 2024, focusing on Minas Gerais. Source: ERA5.

4. WEATHER MONITORING ACTIONS

Cemig has a robust weather forecasting system, which aims to increase the operational efficiency of the company's various activities. The operation of this system will be detailed in the items below.

a) Meteorological Monitoring System

Cemig has a meteorological monitoring system consisting of dozens of automatic data collection stations (figure 19), its own network for detecting atmospheric electrical discharges (figure 20), a satellite image reception station and a C-band meteorological radar (figure 21), strategically installed in the center of the state, being the only company in the electricity sector to have such equipment.

Figure 19 - Cemig's Hydrometeorological Station Network in 2024. Source: Cemig

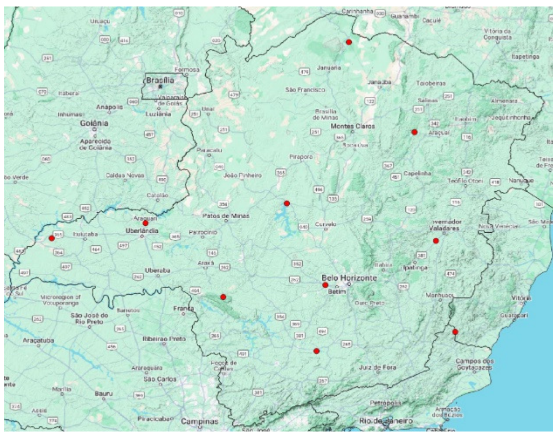


Figure 20 - Cemig Lightning Detection in 2024. Source: Cemig

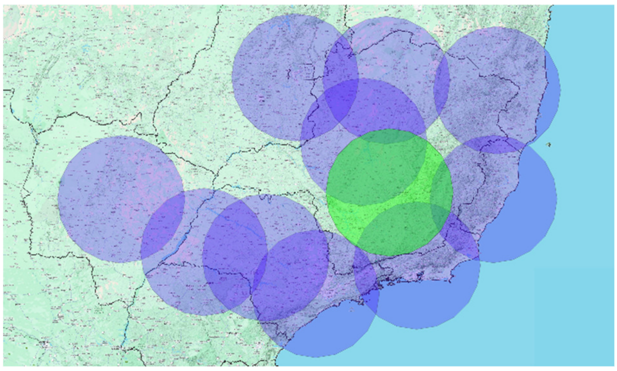


Figure 21 - Radar network used for meteorological monitoring in 2024, highlighting the one belonging to Cemig, in green. Source: Cemig

b) Meteorological Alert System

The increase in storms was also identified by Cemig's meteorology department. Therefore, monitoring and issuing weather alerts becomes an important tool for managing assets and preserving the company's business.

Figure 22 provides a brief summary of the thresholds used to issue these alerts, by variable, so that whenever the meteorologist responsible for monitoring identifies meteorological conditions that could lead to reaching some of these thresholds (Risk), the alert is issued to Cemig's Operation Centers.

ALERTA R1
VENTO: Abaixo de 30 km/h
RAIOS: Sem ocorrências
CHUVA: Ocorrência de chuva moderada, até 10 mm/h

ALERTA R2
VENTO: Entre de 31 e 50 km/h
RAIOS: Ocorrência estratificada dos raios
CHUVA: Entre 11 e 20 mm/h

ALERTA R3
VENTO: Entre de 51 e 70 km/h
RAIOS: Ocorrência simultânea em até metade das cidades do polo
CHUVA: Entre 21 e 30 mm/h

ALERTA R4
VENTO: Acima de 71 km/h
RAIOS: Ocorrência simultânea em todo o polo
CHUVA: Acima de 31 mm/h

Figure 22 - Thresholds used in meteorological alerts. Source: Cemig

In Figure 23 we have the alerts issued for two of these levels in the years 2023 and 2024:

- R2: Alerts related to storms with intense convective activity, with a significant chance of causing strong wind gusts and lightning
- R3: level attributed to storms with extreme convective activity, generally associated with multicellular systems and with the capacity to produce hail.

The R4 alert level graph was not created because the predictability of these events is such that there were no records of alerts being issued at these levels, although events of this magnitude have occurred in Minas Gerais.

In the graph in Figure 23, it is clear, when we compare the number of alerts issued for the same months in 2023 and 2024, that there was an alarming increase from one year to the next in practically all of them.

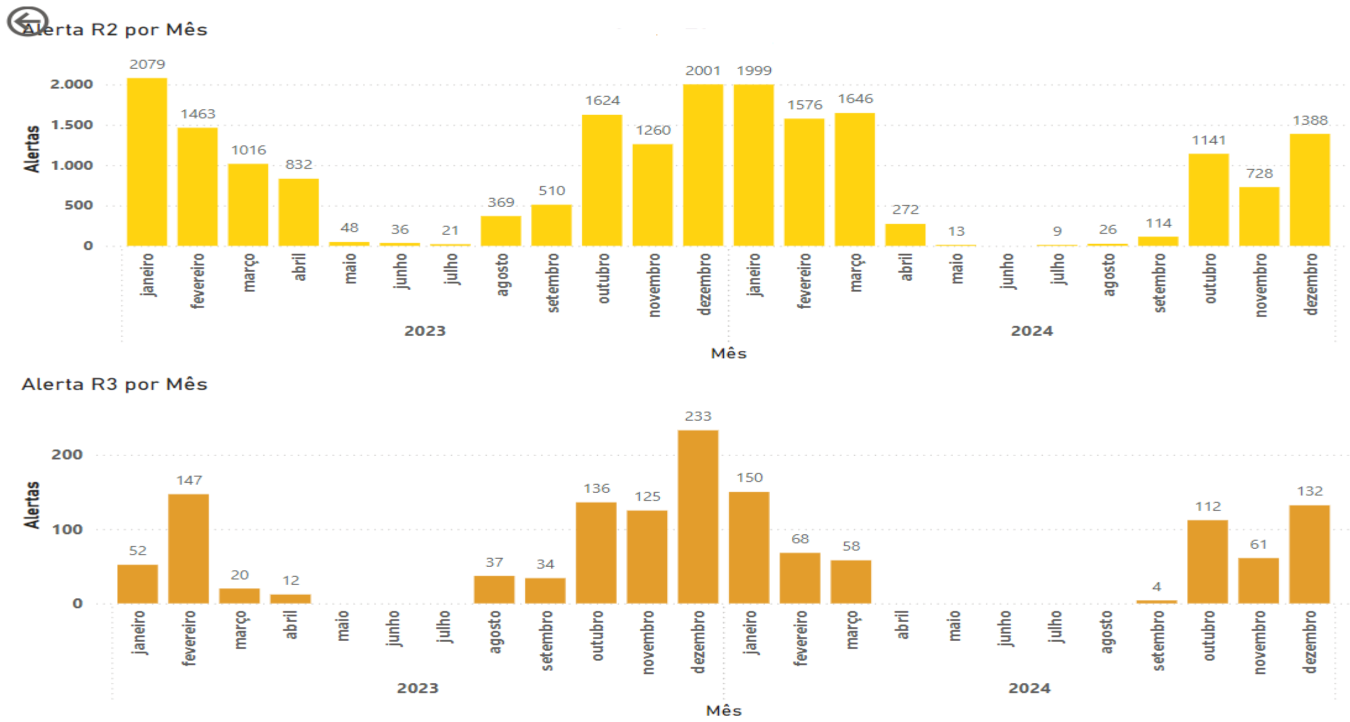


Figure 23 - Totals of weather alerts issued in 2023 and 2024.

c) Fire Monitoring and Alert System

With the systematic increase in the occurrence of fires in recent years, as well as the forecast of an increase in the coming decades, Cemig is sparing no effort to increase its resilience to this phenomenon.

Cemig's Fire Monitoring, Analysis and Alert System was then developed (figure 24), consisting of tools and techniques that allow the company to:

- Identify the regions affected by fires along their transmission and distribution lines. This allows for a more efficient shutdown analysis, optimization of the cleaning activity of powerline easements and environmental education of nearby communities.
- Monitor and issue alerts in real time, allowing field teams to be sent to assess the situation before reaching the lines.
- Calculation of the physical risk of fire ignition, enabling the appropriate sizing of field teams.

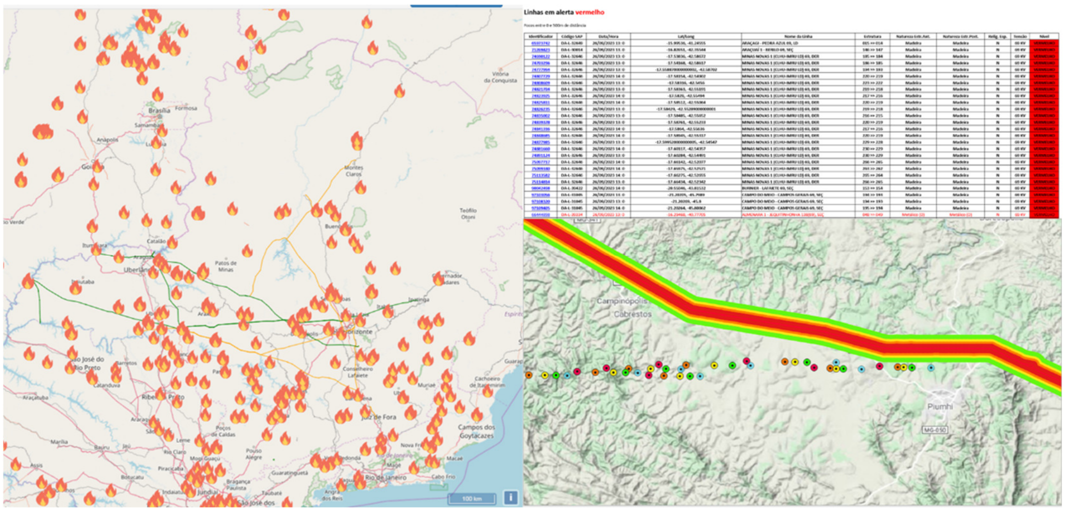


Figure 24 - Example of SMAQ. Source: Cemig.

In 2024, 18,969 fire alerts were issued for Cemig's energy transmission and distribution lines (figure 25).

Number of Fire Alerts

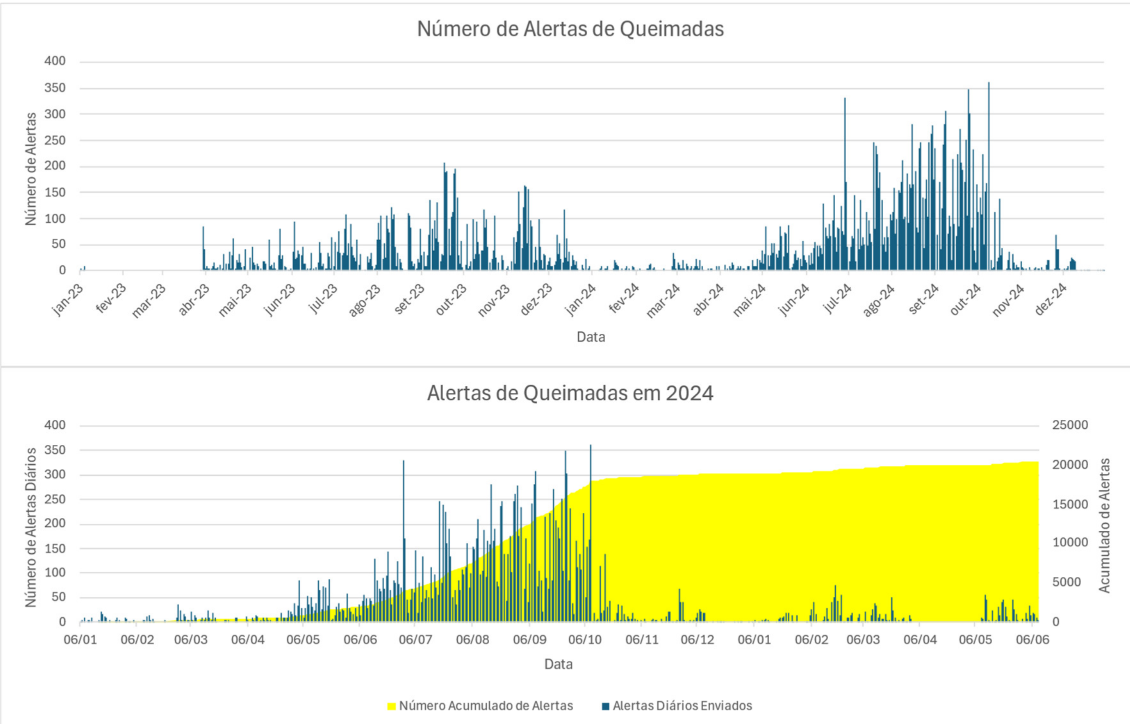


Figure 25 - Fire Alerts issued in 2023 and 2024. Source: Cemig

d) Weather Forecast System

Cemig has a robust weather forecasting system, which aims to increase the operational efficiency of the company's various activities. This system uses data from various sources, both internal, such as data from the weather monitoring system, and external, from observational data to weather models that represent the state of the art in numerical weather forecasting.

To maintain this system, Cemig has its own meteorology team, which uses, in addition to the tools already mentioned, Brazilian, European and American meteorological models in order to generate predicted meteorological scenarios for the company's various activities, with each product created to meet the needs of each sector of the company.

Among the applications of this system, aimed at resilience and adaptability to climate change, some can be mentioned:

- **Storm Forecast**: Storm forecasts are made daily for Cemig's areas of interest, in order to prepare the number of teams needed to deal with possible power outages caused by storms in the Cemig network.
- **Reservoir Operation Planning**: The precipitation forecast is prepared daily to ensure the most efficient and safe operation possible for Cemig's reservoirs, in order to anticipate possible risk situations and avoid or reduce risks to the population, the plant infrastructure and the environment.
- **Maintenance Activities**: To ensure efficient allocation of teams and supplies, specific forecasts for maintenance activities are made available to the target areas in order to plan the appropriate time to carry them out safely and efficiently.
- **Power Generation**: All the company's generation planning is based on hydrometeorological forecasts, to ensure the best use of available resources.
- **Flood Management**: In periods of high rainfall, correct management of reservoirs can prevent the occurrence of damaging flooding events, therefore, in critical periods, real-time forecasts are made, using all the monitoring and forecasting tools available in the company in order to guarantee maximum safety in the operation of the plants.

e) Weather alerts for the state of Minas Gerai

Understanding the major impact of climate change on society, Cemig has had a technical cooperation agreement since 2023 between the company, the Minas Gerais Water Management Institute (Igam) and the State Civil Defense (CEDEC), signed with the Military Office of the Governor. Under this agreement, Cemig and Igam are responsible for issuing meteorological alerts to the State Civil Defense on predetermined days and times about storms that could have serious consequences for the population, allowing the latter to issue alerts to all cities in Minas Gerais.

4.1 Actions in Implementation

The actions listed in the following items are in the <u>implementation phase</u>, having started in 2024 and expected to be completed between 2024 and 2025.

a) Expansion of the electrical discharge detection network

Cemig is part of the National Integrated Network for the Detection of Atmospheric Discharges (RINDAT), which is a network of specialized sensors and processing centers that allow the detection, in real time, of atmospheric discharges in part of the Brazilian territory. Currently, RINDAT is made up of the following institutions: CEMIG, ELETROBRÁS and SIMEPAR.

Cemig's lightning detection network was composed of 6 sensors, but since 2024 it has been in the process of expansion, with the goal of reaching 10 sensors throughout 2025 and, thus, improving the efficiency in lightning detection for Cemig's area of interest. All sensors have already been installed and the new network currently has the distribution seen in figure 26. Final adjustments to the system will be made throughout 2025.

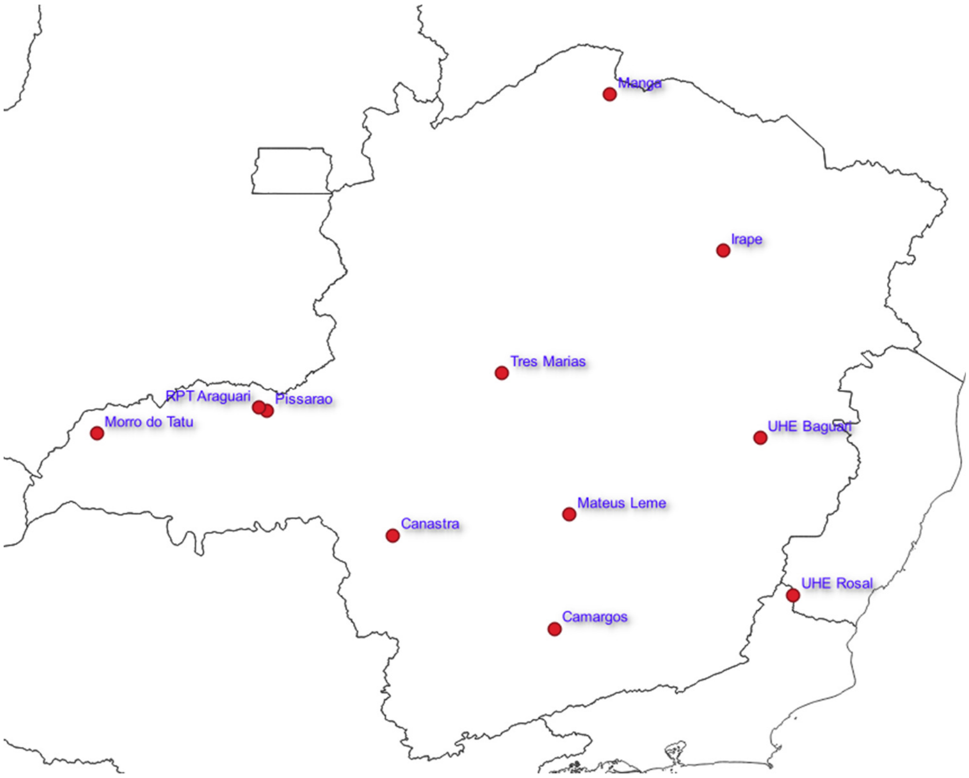


Figure 26 – Cemig's new Lightning Detection Sensor Network (under implementation). Source: Cemig.

b) Expansion of the Anemometric Network

Among the major challenges related to storms, one of them is the low density of meteorological data. Since most phenomena related to storms occur between the convective and mesoscale scales, public and private networks (including Cemig) do not yet have the ideal number of stations to efficiently monitor these phenomena. With this in mind, the company carried out a careful analysis of the location of all meteorological stations available in Minas Gerais and also of the areas most susceptible to storms and decided to expand its anemometric network, acquiring 30 new stations to make up its network. These stations are currently in the process of being installed and will be distributed according to the map in Figure 27, with completion expected throughout 2025.

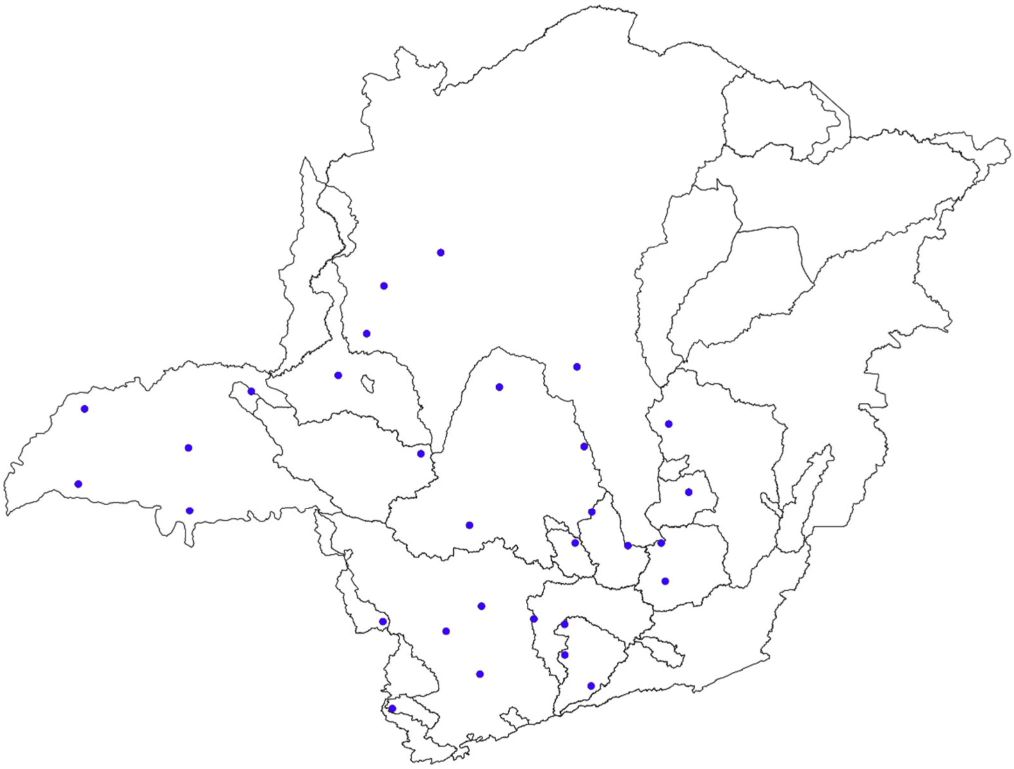


Figure 27 - Location of the 30 new Cemig stations. Source: Cemig.

c) Assessment of the Impacts of Meteorological Effects and Fires on Solar and Wind Power Plants

Considering the safety of Cemig's new wind and solar projects, and in view of the possible risks to infrastructure and personnel, Cemig is expanding the scope of weather and fire alerts to include these new assets, thus ensuring continuity and efficiency in energy generation. It should be remembered that solar farms are very susceptible to extreme gust events, which is why knowing these limits and determining alerts are essential for the safety of these assets.

In addition to atmospheric issues, there is growing concern about rising sea levels in areas where Cemig wind farms are located. Initial analyses indicate a gradual increase in the coming years, as can be seen in the graph in Figure 28.

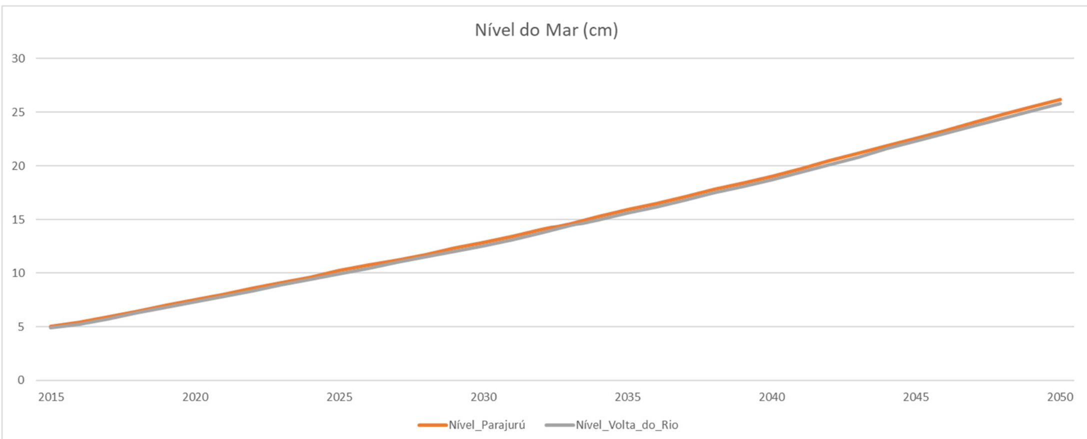


Figure 28 - Projection of mean sea level at Cemig wind farms. Source: CMIP6.

d) Weather Radar Upgrade

Cemig's meteorological radar was acquired in 2011 and has made it possible to provide greater safety for the operation of hydroelectric projects and for society. The radar is also strategic for the control and operation of hydroelectric plant reservoirs. With advance information on the direction of movement and the intensity of rainfall, it is possible to estimate the amount of water that will reach the reservoir and adjust its hydraulic operation to minimize the effects of flooding on the population and the project.

The radar is installed on Morro do Elefante, in the municipality of Mateus Leme, Minas Gerais. Its strategic location, on top of a hill approximately 1,270 meters high and with almost no barriers in its area of influence, allows for a wide-ranging scan, leading to improved meteorological safety throughout the Metallurgical Zone and Campo das Vertentes, much of the Rio Doce Basin, Zona da Mata and Alto São Francisco. With this equipment, it is possible to identify, monitor and estimate the occurrence of precipitation. It is also possible to monitor and identify the type of rain and the occurrence of hail, the intensity of the winds and the speed of movement of the storms.

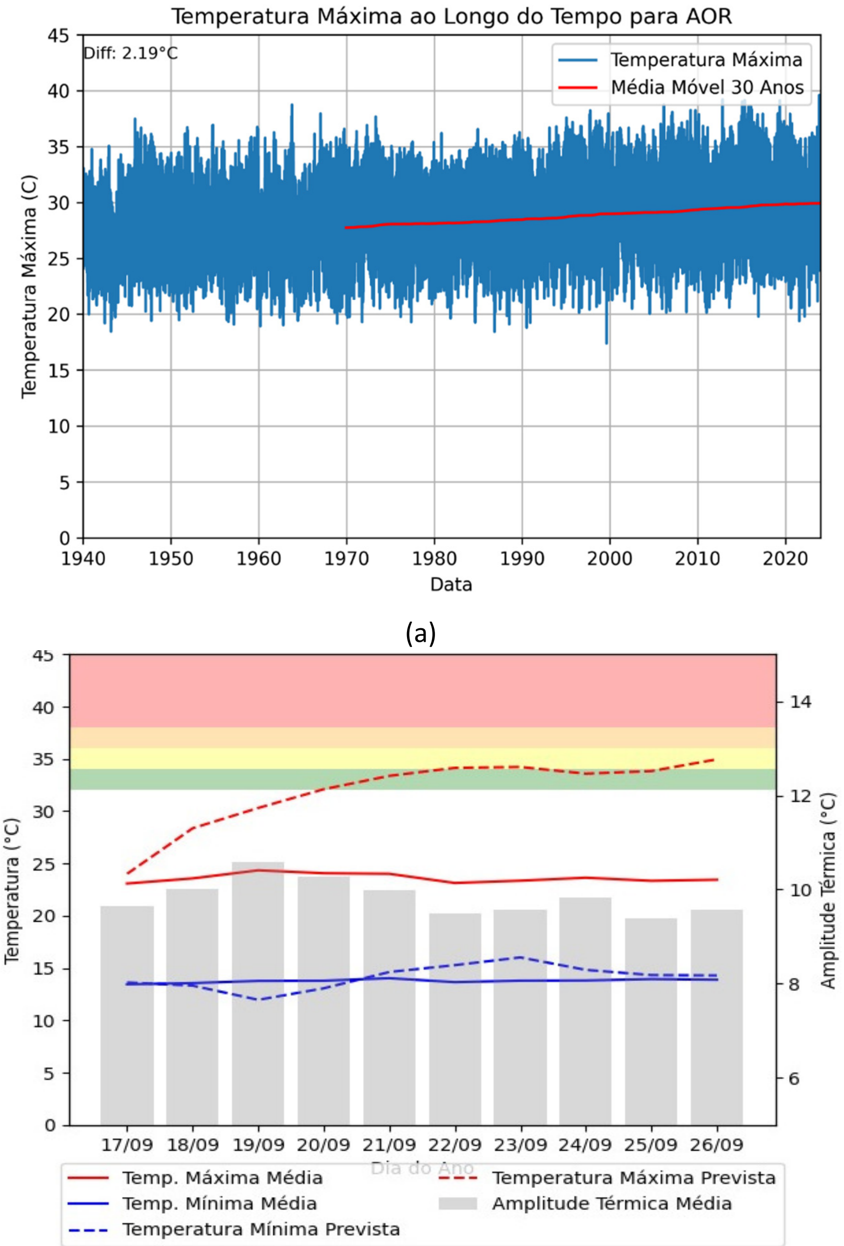
However, it was found necessary to update some of the equipment and computer programs that make up the radar, so Cemig has been investing almost R$ 2 million in the modernization of this important monitoring tool over the years 2024 and 2025.

e) Artificial Intelligence Applied to Weather Forecasting

In 2024, Cemig began using artificial intelligence meteorological models, carrying out analyses on the applicability and performance of the Artificial Intelligence/Integrated Forecasting System (AIFS), provided by the European Centre for Medium-Range Weather Forecasts (ECMWF). AIFS is currently in the process of being operationalized within the company.

f) Heat Waves

Considering the impact that the 2023 heat waves had on Cemig's transmission and distribution equipment, the company began studies related to the predictability and warning of events of this nature in 2024. As a result, a heat wave warning system was created (figure 29), which is currently in the implementation phase.



(b)

Figure 29 - Example of historical analysis (a) and Heat Wave Alert (b) for a Cemig asset. Source: Cemig.

g) Nanosatellites

Cemig is in the process of completing a research project focused on the use of nanosatellites in its activities, and one of the aspects being carried out is their use in monitoring fires, in addition to developing improvements in the company's current fire alert system. Throughout 2024, the project has already shown excellent results and is in the process of being operationalized in the company.

h) Flood Control Supervisory

The main objective of this project is to develop a computer system to assist in the operation of hydroelectric power plant reservoirs, especially during flood control. This system will enable real-time monitoring of reservoir operating conditions, detecting inconsistencies in hydrological data on level, rainfall and flow, suggesting corrections, issuing alerts and performing risk analysis to assist in operational decision-making.

Several approaches were explored, focusing on statistics, traditional hydrology concepts, implementation of models based on physical aspects of phenomena and artificial intelligence tools. The chosen approaches proved capable of assisting the information chain that goes from the collection of observed data to decision-making in the operation, although not all of them have been implemented.

The initial part of the software, responsible for automatic data validation, has already been developed and is currently being tested in a relevant environment, with the expectation of going into production in the coming months. Below are some of the screens related to the consistency of key curves and levels.

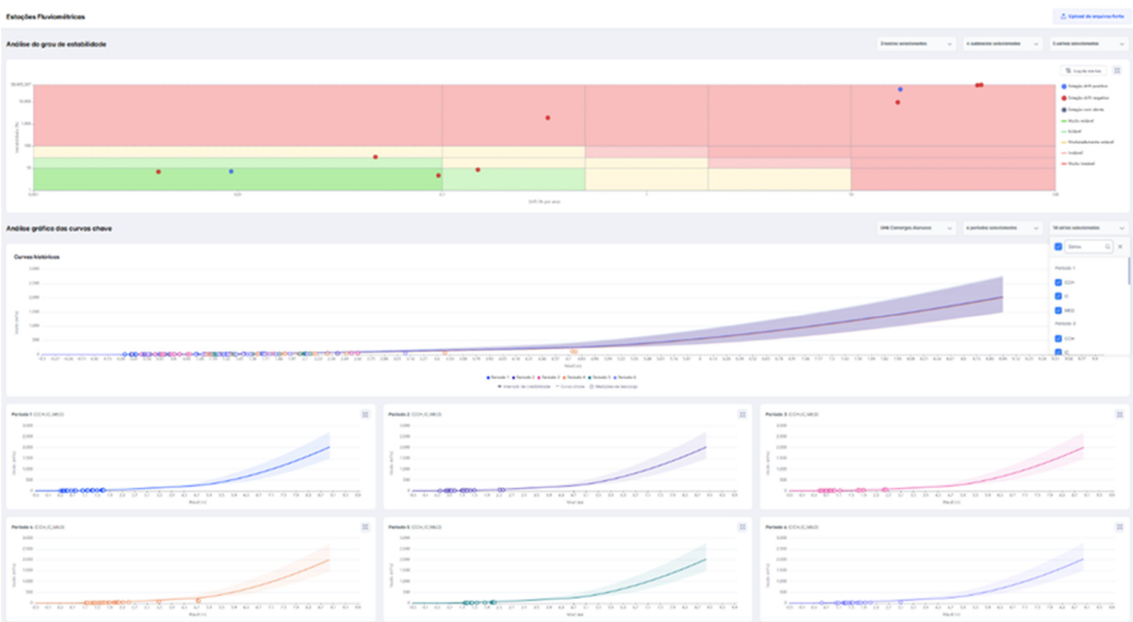


Figure 30 – Example of analysis of the degree of hydraulic stability of fluviometric stations and uncertainty bands of key curves.

Figure 31 – Example of automatic anomaly detection in level series.

4.2 Under Study

The following initiatives include ongoing feasibility analyses, with the aim of defining the means and resources necessary for their implementation, if the analyses indicate gains from their execution.

a) New Weather Radar

Considering the importance of the information generated by a weather radar and taking into account the current distribution of data from this equipment in Minas Gerais (Figure 21), the company is considering the acquisition of another radar, to be installed in the Triângulo Mineiro region (Figure 32). Throughout 2024, financial and technical feasibility studies were carried out to define the acquisition of the equipment, which will continue throughout 2025.

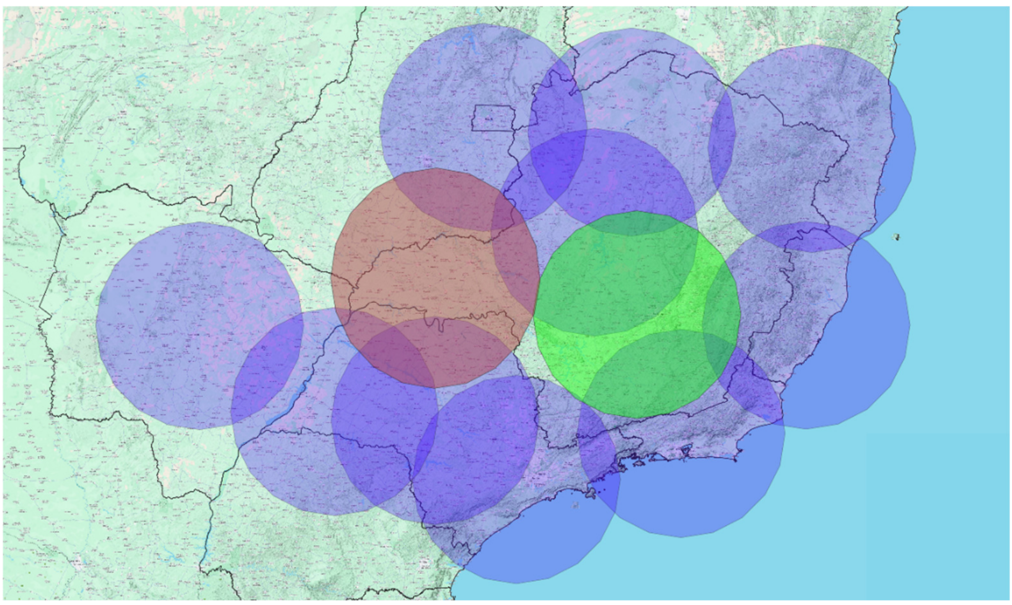


Figure 32 - Possible location of Cemig's new weather radar (red circle).
Source: Cemig.

b) Studies on Monitoring and Predictability of Drought Events

Cemig continues to evaluate the possibility of carrying out research with the aim of creating hydroclimatic indicators of drought events in the company's areas of interest, with the aim of incorporating monitoring and forecasting techniques and tools for different time horizons.

5. DEFINITION OF ADAPTATION ACTIONS

Based on analyses of current climate events and analysis of climate scenarios, the following risks and vulnerabilities of the Company's assets were identified, as shown in Table 1.

Table 1: Vulnerability Identification

Weather event	Risk	Vulnerability
Increased duration and frequency of droughts, heat waves, high temperatures	Reduction in energy generation by hydroelectric plants	Power generation park primarily from water sources Reduction in the capacity to regulate flows for multiple uses Increased application of financial resources for the recovery and revitalization of basins in areas influenced by hydroelectric power plant reservoirs Increased energy costs
High temperatures, increased frequency of droughts	Increased frequency and duration of supply interruptions – transmission/distribution	Electricity transmission and distribution systems located in regions with a higher incidence of fires
Change in wind pattern	Decrease in wind energy supply	Wind generation assets not resilient to extreme events, intermittency of wind generation
Severe winds, extreme and persistent rain, increased incidence of lightning strikes	Increased frequency and duration of supply interruptions – transmission/distribution	Electricity transmission and distribution networks Infrastructure with construction characteristics unsuitable for the increased severity of climate events Transmission lines and towers in hard-to-reach locations Increased application of resources for modernization and resilience of transmission networks
Extreme and persistent rainfall	Effects of floods on hydroelectric power plant reservoirs	Increased sediment deposition in reservoirs Changes in water quality and damage to the ecosystem Damage to plant operational infrastructure Inadequate spill capacity for extreme events Inefficient communication between the company and the population due to the need for operational changes at the plant

Weather event	Risk	Vulnerability
High temperatures, heat waves	Sudden and/or significant changes in electricity demand	Lack of predictability of energy demand, which may pose risks to the transmission/distribution infrastructure Inadequate management for servicing new distributed generation (DG) plants
Severe winds, increased heat waves, increased extreme rainfall	Severe damage to generation, transmission and distribution equipment	Generation, transmission and distribution assets in which the designs did not consider the increase and frequency of the severity of extreme events

The following adaptation actions were prioritized according to the analysis of exposure, vulnerabilities and magnitude of the risk of climate events.

5.1. Adaptation Actions: Distribution

Adaptation actions in energy distribution involve investments to make the network more resilient, capable of withstanding extreme climate events, through investments in modernizing infrastructure, implementing monitoring and protection systems against extreme climate events and structuring the tree and network coexistence program.

RISK a: Increased frequency and duration of power outages
RISK b: Severe damage to distribution infrastructure and equipment
RISK c: Sudden changes in power demand

a. Grid modernization and resilience

With the Distributor Development Plan (PDD), the company invests in the modernization and resilience of the network with a focus on improving the quality of supply, renewing assets, changing the technological level and expanding the energy supply capacity, with new installations and dual-feed circuits for municipal headquarters.

The project for greater network resilience is structured around three main pillars:

I. Improvement of the electrical system infrastructure through modernization, automation, digitalization and expansion works.

II. Reduction of response time to severe weather events, fault correction and service execution, with structured actions for fast and efficient service, in addition to system automation.

III. Robust maintenance program with conservation initiatives for the entire electrical system and advanced predictive maintenance techniques, based on analytical studies and the life cycle of assets.

Among the aforementioned pillars, we highlight:

- **Reclosers:** Reclosers are a great benefit to the continuity of the energy supply, as they automatically restore the electrical system in the shortest possible time in the event of interruptions due to temporary faults. The increase in the number of these devices installed in our distribution network makes the system safer and more reliable, with immediate effects for the entire population. The installation of approximately 5,000 additional devices is planned for the system. 25,000 reclosers were installed by May 2025.
- **Smart meters:** Smart meters allow for the automatic gathering of real-time information about electricity consumption. For the utility company, they bring benefits such as remote reading and power outages. For the consumer, these meters make it possible to know which equipment is consuming the most energy, what times of day consumption is highest, among other information, allowing for conscious energy consumption. The plan is to replace more than one million obsolete meters and install another 1.25 million smart meters, in addition to the necessary investments in telecommunications. 1.7 million smart meters have already been installed by May 2025.
- **Team Preparation:** More teams to provide emergency services will allow Cemig to reduce the average recovery time in the event of electrical system failures or power outages.
- **Maintenance Resources:** Maintenance with a budget, Cemig will carry out inspections on more than 140 thousand km of its energy network, checking the operating and safety conditions, and will prune approximately 600 thousand trees in urban areas and will mow more than 36 thousand km of easement strips below its rural networks (minimizing the possibility of problems with vegetation.
- **Dual Power Supply of Municipalities:** Implement, by 2027, dual power supply for all municipal headquarters in its concession area with alternative power supply options in the event of a failure that leads to the blocking of a circuit.

b. Urban Afforestation

Structuring of the Tree and Power Grid Coexistence Program, which includes the following initiatives:

- Inspection of urban vegetation by arborists to diagnose tree health;
- Replacement of trees that are not suitable for the network;
- Removal of trees at risk of falling;
- Proper disposal of waste (prioritization of agricultural use);
- Donation of seedlings/support for the development of nurseries;

c. Weather Forecasting Tools used in distribution:

- Network of own meteorological stations;
- Dual-polarization C-band meteorological radar;
- Network of sensors for detecting atmospheric electrical discharges;
- Satellite image reception station;
- Meteorological alert issuing system;
- Fire monitoring, forecasting and alert system;
- Climate change monitoring system.

5.2. Adaptation Actions: Transmission

Transmission adaptation actions consist of updating contingency plans, constant training of operation and maintenance (O&M) teams, acquisition of emergency structures and optimization of service logistics for all teams, digitalization of overhead line assets in a geospatial environment, modernization of equipment and line inspection tools.

The measures described below aim to mitigate the risk:
RISK: Increase in the number of interruptions in the transmission of electrical energy

a. Updating Contingency Plans:

Investments in the modernization of these plans, incorporating new technologies such as:

- **GIS Technology:** Allows for precise and detailed geospatial analysis of where our infrastructure is located, facilitating the identification of risk areas and strategic decision-making in emergencies.
- **Emergency Structures** – Triangular Emergency Towers (TET): Provide fast and efficient solutions for the reconstruction of damaged transmission lines, ensuring the rapid resumption of power supply. Equipment was purchased, as planned, and is available for use.

Note:
The same tools as item "c" in section 4.1 apply to power transmission.

5.3. Adaptation Actions: Generation

Faced with the challenges posed by climate change and the growing need to diversify the energy matrix, the company is increasing its investments in solar and wind energy and implementing measures to mitigate the impacts of severe weather events. The measures described below aim to mitigate the following risks:

RISK a: Decrease in hydroelectric generation
RISK b: Effects of floods on hydroelectric reservoirs
RISK c: Damage to generation infrastructure/equipment

a. Effective Management of Hydroelectric Reservoirs:

- **Reservoir monitoring:** The company rigorously monitors river levels and flows, allowing for early identification of risk situations and the taking of preventive measures to avoid flooding and other negative impacts. This practice ensures the safety of dams, the protection of riverside communities and the optimization of hydroelectric power generation.
- **Weather forecast:** Cemig has a robust forecasting system that uses the most modern weather models in the world to ensure the most efficient management of its reservoirs and maximization of the company's hydroelectric generation, with the lowest possible risk. Considering the safety of Cemig's new wind and solar projects, and in view of the possible risks to infrastructure and personnel, Cemig is expanding the scope of weather and fire alerts to include these new assets, thus ensuring continuity and efficiency in energy generation.
- **Hydrological forecast:** To adapt to the climate change scenario, where extreme events (droughts and floods) are becoming more frequent and intense, Cemig has invested in tools that allow it to work with probabilistic forecasts, using several sources of observed precipitation and flow data and meteorological forecast models to feed the hydrological flow forecast models. With the FEWS-Cemig integrative system, we are able to work with a huge number of forecast scenarios and assess the consequences that these various scenarios may have for downstream projects and communities. Thus, if the frequency of events has changed, we are able to apply statistical techniques to adopt the scenarios that best suit the new climate reality in the analyses. In this way, we minimize the risks for the projects and the affected community, acting preventively in alerts.

b. Transparent Communication and Community Engagement:

- **Open dialogue:** Cemig maintains an open and transparent communication channel with the communities affected by the operations of its reservoirs. The company provides updated information on reservoir levels, river flows and safety measures in force, promoting community trust and participation in the management of water resources.
- **Digital tools:** The company provides the Prox app, which allows the population to monitor information on river and reservoir levels and flows in real time. This initiative facilitates access to information, enables the community to actively participate and promotes transparency in the management of water resources.

c. Strategic Partnerships:

- **Collaboration with public agencies:** Cemig works together with civil defense agencies, fire departments, city governments and other relevant agencies to ensure the safety of the population in risk situations caused by climate events. This collaboration demonstrates the company's commitment to public safety and the protection of communities.
- **Participation in river basin committees:** Cemig actively participates in river basin committees, contributing to the participatory management of water resources and to the promotion of sustainable development in the regions. This participation demonstrates the company's commitment to socio-environmental responsibility and to building a more sustainable future for all.

d. Investments in Renewable Energy:

- **Expansion of solar and wind generation:** Cemig is intensifying its investments in the construction of solar and wind power plants, seeking to reduce its dependence on hydroelectric generation in the long term and to fully exploit the complementarity that exists in a portfolio of renewable sources.

5.4. Annex: Adaptation Plan

The plans presented in this report cover 100% of our current and planned operations and are expected to be implemented over the next 5 years.

Table 1: Physical risk adaptation actions by business activity				
Climate event	**Business activity**	**Risk to be reduced**	**Actions implemented until 2024**	**Actions planned for the next 5 years**
Temperature increase	Transmission/ Distribution	- Decrease in hydroelectric generation - Severe damage to infrastructure and equipment for supplying electricity	- Temperature monitoring at local and large scale. - Identification of areas with high observed risk. - Pilot Project in the Betim 6 system, 345 kV on the dynamic capacity of LTs through Digital Twins	- Improvements to the weather forecast system. - Modernization of distribution lines. - Improvements to heat wave forecasting.
Increase in severe winds	Transmission/ Distribution	- Damage to structures supporting overhead power lines - Increase in the frequency and duration of power supply interruptions – transmission/ distribution	- Monitoring of climate events and use of weather alerts as a way of preparing the operations team. - Contingency Plan Training for teams with adjustments and improvements from the last review carried out on contingency plans. - Technical meeting on practical applications of Contingency Plans with other companies in Brazil (CTEEP, TAESA).	- Constant technical training with Operation and Maintenance (O&M) teams to rebuild the Lines. - Acquisition of emergency structures and optimization of service logistics for all transmission teams. - Digitization of overhead line assets in a geospatial environment, modernization of line inspection equipment and tools. - Development of Aneel R&D Projects to measure the impact of climate change on overhead line assets. - Holding technical meetings on new technologies applicable to contingency plans in the energy transmission sector.

Table 1: Physical risk adaptation actions by business activity				
Climate event	**Business activity**	**Risk to be reduced**	**Actions implemented until 2024**	**Actions planned for the next 5 years**
Increased frequency and duration of droughts	Hydroelectric generation	- Reduction of hydro generation	- Investments in new sources of energy generation (solar and wind) - Management of reservoirs to ensure multiple uses of water - Engagement and communication with affected communities	- Investments in new sources of energy generation (solar and wind). - Identify areas most susceptible to reduced water availability through analyses of future climate scenarios.
Extreme and persistent rainfall, extreme winds	Transmission/ Distribution/ Generation	- Increase in the frequency and duration of power outages - Damage to reservoir structures, including the risk of rupture.	- Modernization of distribution lines: automation of reclosers, digitalization and modernization of substations. - Contingency Plan training for teams that includes the adjustments and improvements identified in the last review of these plans. - Technical meeting on practical applications of Contingency Plans from other companies in Brazil (Cemig D, CTEEP, TAESA, Seccional and Imagem Geosistemas). - Hydrometeorological Forecasting System for all plants. - Dam monitoring program.	- Conduct ongoing technical training with O&M teams to rebuild lines. - Acquisition of emergency structures and optimization of service logistics for all transmission teams. - Digitization of Overhead Line assets in a geospatial environment, modernization of line inspection equipment and tools. - Development of Aneel R&D Projects to measure the impact of climate change on overhead line assets. - Search for innovative engineering solutions available on the national and international markets that contribute to increasing the resilience of the electricity sector. - Holding new technical meetings on new technologies applicable to the contingency plans of the energy transmission sector. - Implementing new versions of meteorological models. In addition to calibrating/recalibrating hydrological models for forecasting flows.

Table 1: Physical risk adaptation actions by business activity				
Climate event	**Business activity**	**Risk to be reduced**	**Actions implemented until 2024**	**Actions planned for the next 5 years**
Increased frequency of droughts	Transmission/ Distribution	- Severe damage to electricity supply infrastructure due to increased incidence of fires	- Mechanized strip cleaning. - Development of the fire monitoring system, online platform www.apagaofogo.eco.br.	- Carry out mechanized strip cleaning and improve the fire monitoring system, online platform www.apagaofogo.eco.br.