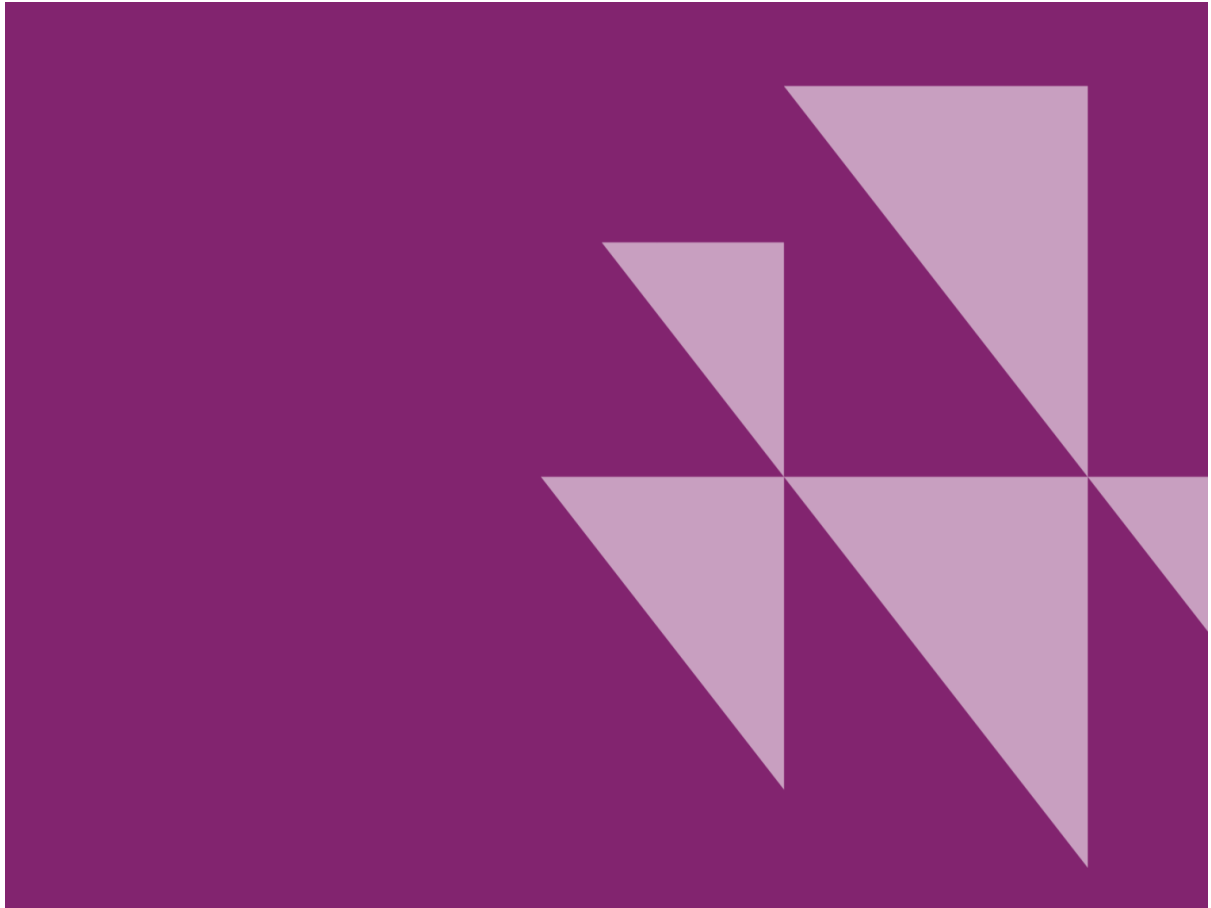


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# CDP Climate Change 2020 Questionnaire

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## C0. Introduction

### C0.1

#### (C0.1) Give a general description and introduction to your organization.

Founded in 1952 by the governor of Minas Gerais at the time, Juscelino Kubitschek de Oliveira, Companhia Energética de Minas Gerais (Cemig) operates in the areas of generation, transmission, sale and distribution of electricity, energy solutions (Cemig SIM) and distribution of natural gas (Gasmig). The group consists of the holding company Companhia Energética de Minas Gerais (Cemig), the wholly-owned subsidiaries Cemig Geração e Transmissão S.A. (Cemig GT) and Cemig Distribuição S.A. (Cemig D), totaling 173 Companies, 15 Consortia and two FIPs (Private Equity Interest Fund), resulting in a footprint in 22 Brazilian states and the Federal District. Since its inception, the Company has taken on the role of bringing collective well-being to the regions where it operates, in an innovative and sustainable way. This determination led it to become the largest energy distributor in terms of power lines and networks, and to be one of the largest energy generation and transmission companies in Brazil. In addition to the generation, transmission and distribution of electric energy, Cemig also operates in the natural gas commercialization and distribution segment by means of Gasmig, which is the exclusive distributor of piped natural gas throughout the state of Minas Gerais. In addition, the Company has a direct (26.06%) and indirect (23.93%) interest in the capital stock of Light SA, where it is a member of the control block, and also holds a 21.68% interest in the capital stock of Transmissora Aliança de Energia Elétrica S.A. - Taesa, which gives it the control of that company.

Cemig is a publicly-traded company controlled by the Government of the State of Minas Gerais (51%), with its shares traded in São Paulo, in B3 S.A. (Brazil Bolsa Balcão), in the New York Stock Exchange (NYSE), and in Madrid, in the Latin American Securities Market (Latibex).. The Company's consolidated net operating revenue reached R\$ 25.39 billion in 2019, based on a matrix whose main source of energy is renewable resources.

Cemig's power generation complex installed capacity is 6,020 MW; 98.06% come from hydraulic generation plants, 1.91% from wind generation, 0.02% from solar generation, and 0.01%, from thermal generation. It is important to stress that, at the end of 2019, TPP Igarapé, the Company's only Thermal Power Plant, was deactivated, making Cemig's power generation complex 100% renewable. In addition, the Company has 4,930 km of power transmission lines. In the area of electricity distribution, it is responsible for the management of the largest power distribution network in Latin America, over 539 thousand km in length. At the end of 2019, Cemig had 6,083 employees.

Thanks to its commitment to socio-environmental responsibility principles, its economic-financial strength, and technical excellence, the Company is internationally acknowledged as a benchmark in sustainability in its industry, and is positioned as one of the major vectors of consolidation in the Brazilian electricity sector. Cemig has been included in the Dow Jones Sustainability Index (DJSI World) for 20 years, and the Dow Jones Sustainability Emerging Markets Index (DJSI Emerging Markets) for six years, both since they were established. It also is included in the B3 Corporate Sustainability Index (ISE) for the 15th consecutive year, and was selected for the 9th time to be included in the Carbon Efficient Index (IC02) created in 2010 by B3 and BNDES.

In 2019, Cemig was listed among the leading companies in climate change and water security management in Latin America, under the Climate Change and Water Security Programs, for the quality of the information disclosed to investors and the global market. Recognition was granted by CDP Latin America. This is the eighth consecutive year that CDP has awarded the Company. The selection took into account the level of detail in the responses regarding criteria such as risk management, commitment to mitigations, and initiatives to reduce greenhouse gas emissions. The best results point to a high level of transparency in the disclosure of information related to the topic, providing investors with consistent content on climate change management and water security.

Mission: Provide clean and accessible energy integrated solutions to society, in an innovative, sustainable, and competitive way.

Vision: To be among the three best integrated electric power groups in Brazil regarding governance, financial health, asset performance and customer satisfaction.

### C0.2

#### (C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Reporting year	January 1 2019	December 31 2019	No	<Not Applicable>

### C0.3

#### (C0.3) Select the countries/areas for which you will be supplying data.

Brazil

### C0.4

#### (C0.4) Select the currency used for all financial information disclosed throughout your response.

BRL

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Operational control

C-E U0.7

(C-EU0.7) Which part of the electric utilities value chain does your organization operate in? Select all that apply.

Row 1

Electric utilities value chain

- Electricity generation
- Transmission
- Distribution

Other divisions

- Gas storage, transmission and distribution

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Other C-Suite Officer	The person who is at the highest level of direct responsibility for the climate change matter at Cemig is the Business Communication and Sustainability Deputy Director, who reports directly to the Cemig CEO, the CEO being the highest level of the Executive Board, who, in turn, reports directly to the Board of Directors. Cemig's Administration is comprised by the Board of Directors and the Executive Board. Members of the Board of Directors, chosen by the General Shareholders' Meeting, appoint their Chief Executive Officer, the Deputy Director, and the Executive Board. The Executive Board, the body the Communication and Sustainability Deputy Director is assigned to, is considered a group belonging to the Company's management. The job duties of the Communication and Sustainability Deputy Director, defined and approved by the Board of Directors, are to collaborate with the Chief Executive Officer in exercising his duties and replacing him in cases of absence, leave, vacancy, impediment or resignation. The current Business Communication and Sustainability Deputy Director has solid experience in the field, with over 25 years of market experience. Their various duties include, for instance, approval of technical norms and normative instructions required for corporate sustainability development, climate change, and social responsibility, in line with strategic drivers and sectoral control. In 2019, this Director approved a Strategy for Coping with Cemig's Climate Change, which consists of: Identifying risks and opportunities; promote new businesses and technologies; create a clean energy seal; perform R&D with identification of locations in Cemig's concession area to repair extreme events; position Cemig SIM as a low carbon products and services arm; manage carbon credits; having a clear indicator of the energy matrix with a minimum percentage of sources of generation in renewable energy; efficiently manage GHG orders; develop SBTi goal; Participate in Committees and Work Groups related to the theme; improve the engagement of the external and internal public; maintain participation in the main sustainability indexes.

C1.1b

**(C1.1b) Provide further details on the board's oversight of climate-related issues.**

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding annual budgets Reviewing and guiding business plans Setting performance objectives Overseeing major capital expenditures, acquisitions and divestitures	<Not Applicable>	Review and orientation of the strategy and business plans - In drafting its strategy, Cemig considers the principles in the "Commitment to Climate Change" document, which contains the guidelines for the Company's performance in relation to the matter. In 2019, Cemig's strategic planning was revised, with the participation of Senior Management and the management body. One of the long-term strategic guidelines of the new planning, composed of the Long-Term Strategy (2019-2040) and the Multi-Annual Business Plan (2019-2025) is to achieve a high standing in the domestic and international governance and sustainability rankings, which includes a leadership position on climate issues. Cemig's Business Sustainability Committee aims at proposing policies, guidelines, actions, plans and projects, in addition to strategic initiatives, to foster performance in the social, environmental, economic and corporate governance aspects. All topics discussed are considered by Senior Management, including issues related to climate change. Review and guidance of major action plans - As a result of the strategy, the actions that require approval or performance by the Board are discussed in meetings, always following the guidelines in the "Commitment to Climate Change" document in order to achieve the objectives and targets related to climate change. Review and guidance of annual budgets - The Board considers the budgetary needs for execution of action plans that guarantee effective implementation of the strategy regarding climate change - objectives, goals and programs - and promotes its periodic monitoring. Definition of performance objectives - The Company has indicators for monitoring and assessing the business, including indicators of interruptions in the supply of energy. In the case of Cemig, these indicators are strongly related to climate, since the physical structure and the hydroelectric power generation capacity are exposed to climatic risks. Major capital expenditure, acquisition and disposal supervision - The Board of Directors is responsible for approving the Annual Budgets and deciding - on a proposal by the Executive Board - on investment projects, disposal of assets, and others. In 2019, the Board approved the launch of Cemig Soluções Inteligentes em Energia - Cemig SIM - via a merger of two of its subsidiaries - Cemig GD and Efficientia. In 2019, it was decided to deactivate Thermal Power Plant (TPP) Igarapé, Cemig's only Thermoelectric generation project. Among other reasons, deactivation of TPP Igarapé took considered emissions associated with its operation. The Board also approved a BRL 115M investment in innovation projects, with the opening of 2 bid notices for electric mobility solutions and a notification device in case of dam emergencies.

C1.2

**(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.**

Name of the position(s) and/or committee(s)	Reporting line	Responsibility	Coverage of responsibility	Frequency of reporting to the board on climate-related issues
Other C-Suite Officer, please specify (Business Communication and Sustainability Deputy Director)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	More frequently than quarterly
Sustainability committee	<Not Applicable>	Assessing climate-related risks and opportunities	<Not Applicable>	More frequently than quarterly
Environment/ Sustainability manager	<Not Applicable>	Assessing climate-related risks and opportunities	<Not Applicable>	More frequently than quarterly

C1.2a

**(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).**

The Business Communication and Sustainability Deputy Director heads the Business Communication and Sustainability Sector and the Sustainability Department that manages the Climate Change theme and the Sustainability Plan at Cemig. The Deputy Director gives guidelines and validates actions on this topic. The Deputy Director answers directly to the Company CEO, that being the highest level of the Executive Board that, in turn, reports directly to the Board of Directors. This provision grants required autonomy to the area in charge of managing the theme in carrying out Cemig's guidelines and in interacting with the other areas of the Company that contribute to this theme management.

In the Corporate Communication and Sustainability Department, the Corporate Sustainability Management has the main responsibilities and duties associated with issues related to climate. Examples:

- Follow up and monitor institutional and business changes related to corporate sustainability, climate change, and social responsibility and, if necessary, propose changes to the Company's guidelines, drivers, indicators, goals, and strategic initiatives;
- Assist in proposing and approving of technical standards and regulatory instructions necessary for the development of corporate sustainability, climate change, and social responsibility, in line with strategic drivers and sectoral regulation;
- Analyze and prospect trends, risks, and opportunities in the area of

climate adaptation and mitigation, through research and studies of the best national and international practices, as well as conduct and enable studies on the assessment of climate risks in Company activities;

- Act in the development and structuring of corporate policies, guidelines and procedures related to climate adaptation and mitigation, together with related areas and in line with the Company's guidelines, drivers, indicators, goals, and initiatives;

· Provide inputs to strategic planning in relation to climate change and propose guidelines on the theme, as well as follow the global and local discussion on issues related to the theme such as regulatory frameworks, formal and voluntary emission market, carbon pricing, taxation, etc.;

· Perform quantification of Cemig's GHG emissions and projects developed by the Company (energy efficiency, fuel/energy substitution, carbon reduction projects, energy losses in transmission and distribution, and others), in order to comply with legislation and corporate sustainability requirements, in addition to providing information on emissions from energy purchased by medium and large customers.

The Sustainability Management surveys and evaluates Cemig's risks and opportunities in the face of climate change, as well as the respective monitoring of these risks and opportunities, always acting jointly with the Corporate Risk Management and other related areas (Energy Efficiency Management, Department of Management and Control of Measurement and Commercial Losses from Distribution, Management of Energy Planning and Water Resources) in all phases of the process, via the integrated approach that guides Cemig's risk management.

The Company has a decentralized process for monitoring issues related to climate change, each project/area having its own practices/routines. The Sustainability Plan completed in 2019 presents indicators of climate strategy that will enable better management of the company's performance on this theme. The monitoring of meteorological indicators is an example of control, with weekly analysis of weather forecasts and measurement of possible impacts on operations. From that, it is possible to mobilize repair teams in the electrical system and respond more quickly to system occurrences, reducing power outage time.

In 2019, Cemig formalized the creation of its Corporate Sustainability Committee, aimed at consolidating the integration of corporate sustainability in the management process, proposing policies, guidelines, actions, plans, and projects, in addition to strategic initiatives focused on its contribution to sustainable development. The Committee is made up of seven representatives and their respective deputies from different areas, who have to monitor and anticipate market trends and practices related to corporate sustainability, as well as themes associated with climate change, proposing actions and initiatives to leverage opportunities or reduce exposure risks and relevant impacts on the Company. The Committee is advisory in nature, but because it is linked to the Company's main executive boards, it has great influence on decision-making within Cemig.

## C1.3

### (C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	Cemig encourages the management of climate-related issues through goals and results. In 2019, Cemig considered the quality indicators in the electricity supply DEC (Equivalent Interruption Duration per Consumer Unit) and FEC (Equivalent Interruption Frequency per Consumer Unit), which are linked to the variable remuneration of all employees. In addition to these indicators, EIMRGF, an index that measures the amount of Energy Impacted by the Physical Guarantee Reduction Mechanism (often not generated due to variations in the climate regime in watersheds) was also associated with variable employee remuneration. As of 2020, a new index called ISUSTENT, which measures Cemig's participation in the major Sustainability Ratings in Brazil and the World, will impact the variable remuneration of the Sustainability Management (DPR/SE).

## C1.3a

### (C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive	Type of incentive	Activity incentivized	Comment
Corporate executive team	Monetary reward	Efficiency target	Indicator: quality of electricity supply. The DEC indicator (Equivalent Interruption Duration per Consumer Unit) is a tool that contributes to the assessment of the effectiveness of actions and initiatives to meet the standards required by the regulatory body and expected by customers. Given that most interruptions in the power supply are caused by trees, windstorms, and lightning, which can damage the facilities that convey and distribute energy, many DEC indicator control initiatives are directly related to climate change. With regard to the remediation of impacts caused by trees, the Company is getting ready for more severe weather events, when the degree of risk posed by vegetation is high. These indicators are linked to the variable remuneration of all the Company's employees. Indicator: Energy Impacted by the Guaranteed Power Output Decrease Mechanism In Brazil, energy provided by National Interconnected System (SIN) is the benchmark for national supply. For this, the Ministry of Mines and Energy (MME) grants each plant a certificate corresponding to the maximum amount of energy it can sell, called Guaranteed Power Output. The EIMRGF indicator tracks the total amount of energy impacted by the Physical Guarantee Reduction Mechanism, and its results reflect the operational availability of hydroelectric plants in an accumulated period of 60 months, compared to the reference value certified by MME. Considering Cemig's generating complex is mainly made up of hydroelectric plants, climate change can directly impact the availability and reliability of reservoirs due to extreme events that alter precipitation patterns, extending drought periods. That indicator is linked to the variable remuneration of all the Company's employees.
All employees	Monetary reward	Efficiency target	Indicator: quality of electricity supply. The DEC indicator (Equivalent Interruption Duration per Consumer Unit) is a tool that contributes to the assessment of the effectiveness of actions and initiatives to meet the standards required by the regulatory body and expected by customers. Given that most interruptions in the power supply are caused by trees, windstorms, and lightning, which can damage the facilities that convey and distribute energy, many DEC indicator control initiatives are directly related to climate change. With regard to the remediation of impacts caused by trees, the Company is getting ready for more severe weather events, when the degree of risk posed by vegetation is high. These indicators are linked to the variable remuneration of all the Company's employees. Indicator: Energy Impacted by the Guaranteed Power Output Decrease Mechanism In Brazil, energy provided by National Interconnected System (SIN) is the benchmark for national supply. For this, the Ministry of Mines and Energy (MME) grants each plant a certificate corresponding to the maximum amount of energy it can sell, called Guaranteed Power Output. The EIMRGF indicator tracks the total amount of energy impacted by the Physical Guarantee Reduction Mechanism, and its results reflect the operational availability of hydroelectric plants in an accumulated period of 60 months, compared to the reference value certified by MME. Considering Cemig's generating complex is mainly made up of hydroelectric plants, climate change can directly impact the availability and reliability of reservoirs due to extreme events that alter precipitation patterns, extending drought periods. That indicator is linked to the variable remuneration of all the Company's employees.
All employees	Non-monetary reward	Efficiency project	Devised in 2018, the Movimenta Program is an ongoing program to encourage the culture of innovation by the registering of projects with the potential to create value for Cemig, presented by the Company's employees themselves. Its goal is to stimulate participation of employees in a search for solutions aimed, among other things, at improving corporate sustainability levels, without prejudice to returns from economic and financial sides. Employees who stood out in the 2019 Movimenta Program were awarded by the board at a ceremony held in Belo Horizonte, at the Company headquarters. The 2019 edition of the program had 96 projects registered, 18 of which were approved in all phases of the public tender. A highlight among the projects approved in 2019 consists of a software package that automates feasibility studies for distributed mini generation connections in the Company's grid. This way, the company is contributing to the diversification of the energy matrix and the increase of renewable energy production by allowing for DG connections on a larger scale. The project in question saved over R\$ 80 K in expenses, with an increase in productivity of more than 1,500% when carrying out these feasibility studies. In 2017, Cemig held the Ideia Iluminada Contest, which aimed at fostering solutions geared at reducing fuel consumption, raising efficiency in energy and water consumption, and reducing the production of waste. Of the 44 projects submitted by Cemig employees, for were selected and the first to be deployed was a system for using rainwater for consumption in the Company's main building in Vila Mariana neighborhood, in the city of Governador Valadares. The project opened in December 2018. And its results were disclosed in a company internal publication as a way of acknowledging the effort carried out.

Other, please specify (Superintendence of strategy planning and management team)	Non-monetary reward	Other (please specify) (Performance in sustainability index)	Annually, after the release of the new Dow Jones Sustainability Index portfolio, the Sustainability Management team is presented with a celebratory lunch. This lunch is provided as a way of rewarding Cemig remaining in the index, thus reaffirming the Company's leadership position in the themes that drive sustainable development, among which climate change is extremely relevant for the Company.
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## C2. Risks and opportunities

### C2.1

#### (C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

### C2.1a

#### (C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	1	This timeframe is in line with the annual review frequency of the Company's Long-Term Strategy, the Multi-Annual Business Plan and the Annual Budget. Annually, the administrators and committee members must also undergo a performance assessment for the exposure of the management acts practiced, contribution to the results of the fiscal year, achievement of the objectives laid down in the Multi-Annual Business Plan, and compliance with the Long Term Strategy Deadline and Annual Budget.
Medium-term	1	7	This timeframe is in line with the period covered by the Company's Multiannual Business Plan, which reflects the assumptions of the Long-Term Strategy and contains the goals for at least 5 years including the Annual Budget. Among other items, the Plan details: (i) the Company's strategies; (ii) new investments and business opportunities; (iii) amounts to be invested; and (iv) return rates and profits to be obtained or generated by the Company.
Long-term	7	21	This timeframe is in line with the period covered by the Company's Long-Term Strategy (2019-2040). The Long-Term Strategy includes the Company's strategic foundations (mission, vision and values), as well as long-term strategic guidelines.

### C2.1b

#### (C2.1b) How does your organization define substantive financial or strategic impact on your business?

Cemig defines strategic risks as those related to the Company's objectives and vision, or to strategic decisions that risk not achieving the planned success. These risks are classified based on the financial impact in the event of materialization, using the loss of net revenue as the measurement metric. Risks with considerable financial impact are those that can cause a significant adverse effect on the business, affecting the financial condition and results of operations. Cemig assesses the financial impact to all its strategic risks prioritized by the Board of Directors, the so-called Top Risks (therefore, all the Top Risks can be considered as substantive impacts in Cemig's business). Financial impacts of risks can be graded in a 6-level classification. These levels range from very low (requires interventions within the company's governance and at board deliberation level) to catastrophic (the company will have difficulty recovering within 5 years, the impact is very comprehensive, and is irreversible). In this assessment, the financial impacts range from R\$ 0-15 million (first impact range) to over R\$ 1 billion (final impact range) and, thus, the financial impact of each risk is estimated. This indicator goes for the whole Company. Besides the financial impact, the Top Risk identification and review process assesses the possible impact of each risk on the aspects of image and reputation, environmental and compliance. These aspects were defined with the support of the areas related to the matter and validated by the Corporate Risk Monitoring Committee, which represents Cemig's boards.

Cemig uses scales to classify risks and opportunities according to their financial impacts, intangible impacts, probability of occurrence, and relevance to the Company, with the distribution of percentage estimates between the points in each of the scales. Based on these scales, Cemig prioritizes each risk, which allows the ranking of risks within a matrix of exposure to risks/opportunities containing the risks/opportunities surveyed throughout the process. In addition, the aforementioned "financial impacts" variable used to define the risk/opportunity position in the exposure matrix, information on the financial implications of risks/opportunities is specifically fed with their controls and measures. Considering this, the system calculates the inherent risk/opportunity (that is, without management actions) cost/return, the residual risk/opportunity (after implementing controls), and the planned residual risk/opportunity (after implementing measures). This allows decision-making prioritized based on a robust financial analysis of scenarios with and without risk/opportunity management. At the present time, this analysis covers only the company's direct operations.

### C2.2

#### (C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

##### Value chain stage(s) covered

Direct operations

##### Risk management process

Integrated into multi-disciplinary company-wide risk management process

##### Frequency of assessment

Annually

##### Time horizon(s) covered

Medium-term

## Description of process

Risk and Internal Control Management is responsible for providing a methodology for identifying and assessing risks. That Management conducts this process at the areas responsible for actions related to prevention, mitigation, and monitoring of each mapped risk. The modeling and analysis of operations from the point of view of risk management aims to optimize investments in activity control, reduce costs and losses, improve performance and, as a consequence, help achieving the goals set by the Company. Cemig has a risk management software - SAP RM (Risk Management) - that allows the risk mapping process to be carried out continuously, as the updating of information, and assessments of controls and action plans are communicated by the holders of each activity within the system. When a risk is mapped for the first time at Cemig, the corporate methodology requires the following steps to be followed: I) Identification - corresponding to understanding the scope, causes, and impacts of the risk; II) Analysis - where the probability of occurrence is estimated, and the possible impacts, should that risk materialize; III) Treatment - the survey of all actions and controls that act to mitigate that risk, as well as the mitigating effect of these actions on the mapped impacts; and IV) Monitoring - which consists of inserting the risk in the corporate tool, managing self-assessments of controls, mitigating initiatives, and validating risk with its holder. When there is a need to review a risk that has already been mapped, all information is updated via the system. With risk mapping, a report is produced containing the major pieces of information relating to that risk, the Risk Report. In 2019, Top Risk mapping was guided by themes prioritized by the Corporate Risk Monitoring Committees - CMRC and validated by the Executive Board and the Board of Directors, with highlight for themes like dam breaches, accident with the population, diseases among the workforce, violation of environmental obligations, and others. Reporting of Top Risks to the Executive Board and the Board of Directors, as well as CMRC's treatment recommendations for each case, are continuous and strict according to the streamflow approved by the Committee. Risks of different types can present the climatic factor in their analysis. For example, the risk of "Non-compliance with the DECI defined by the Regulator", associated with the fulfillment of service quality goals (DEC and FEC indicators), went through the entire risk mapping process. In the Identification phase, one of the causes raised was the severe climatic conditions (higher frequency of high-speed winds). In the Analysis phase, the risk was classified within the classes of the risk matrix, considering its different dimensions. In the Treatment stage, actions were listed in line with the PDD - Cemig's Distribution Development Plan, such as works and maintenance in Medium and High Voltage networks. Finally, in the Monitoring stage, it was validated with the person in charge, with stipulated deadlines that support risk management. Regarding opportunities, there is a coordinated process for mapping and developing improvement actions. The management of the company's opportunities begins in the five-year cycles of strategic planning review, when strategic directions are defined regarding the opportunities to be explored by the company in coming years. After defining the lines of action, the business areas are responsible for developing opportunities and monitoring is carried out at meetings of the executive board. Business opportunities related to climate change are also part of the scope of this process. The entry into the distributed generation business and investments in R&D from specific bid notices are examples of opportunities for transition to a low-carbon economy and an energy-efficient economic system.

## C2.2a

### (C2.2a) Which risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Regulatory changes: Via the Climate Change National Policy, the Brazilian government made its contribution to the Paris Agreement official by taking on - via the Nationally Determined Contribution (NDC) the commitment to reduce greenhouse gas emissions by 37%, in relation to the 2005 levels, by 2025, with a subsequent indicative contribution to reduce greenhouse gas emissions by 43%, in relation to the 2005 levels, by 2030. The Company considers that adaptation to regulatory changes imposed by the government in order to achieve national goals is the major impact of that risk. With the shutdown of the Company's only thermal power plant in late 2019, this risk stabilized, but it may still materialize in the medium term, if Cemig needs to return to invest in and consequently it is unable to reduce its GHG emissions. Cemig seeks to implement measures to mitigate this impact, looking for opportunities to expand energy generation from low carbon renewable sources. Another way to mitigate this risk is via participation in sectoral associations like the CEBDS (Brazilian Business Council for Sustainable Development), which holds discussions on the risks associated with new regulations in Brazil. Other regulatory risks: In order to propose measures to stimulate energy efficiency Brazil, the Ministry of Mines and Energy published the National Energy Efficiency Plan (PNEF). PNEF adopts the target of a 10% reduction in electricity consumption for the year 2030, based on the consumption scenario of 2004. The company considers that the reduction in demand and the supply of electric energy by Cemig to its consumers influencing the Company results is the major impact of this risk. The way to act to mitigate this risk is through participation in legal discussion venues, both at the federal and at the state and municipal levels, to anticipate the facts and plan accordingly. Additionally, Cemig promotes both residential and industrial Energy Efficiency Programs.
Emerging regulation	Relevant, always included	Carbon taxation: Via the Climate Change National Policy, the Brazilian government made its contribution to the Paris Agreement official by taking on - via the Nationally Determined Contribution (NDC) the commitment to reduce greenhouse gas emissions by 37%, in relation to the 2005 levels, by 2025, with a subsequent indicative contribution to reduce greenhouse gas emissions by 43%, in relation to the 2005 levels, by 2030. The Company considers the creation of a carbon tax and the consequent increase in operating costs the major potential impact of that risk. In 2019, the Company's only fossil fuel-fired thermal plant was deactivated; thus, Cemig's current electricity generation matrix is 100% renewable. However, this taxation is also a risk if Cemig needs to expand its electricity generation business in the future through fossil fuel-fired power plants or if scope 2 emissions are considered. Considering direct emissions in 2019, without Thermal Power Plant (TPP) Igarapé, the expected impact would amount to about R\$ 645,705.00 (dollar at 4.18 and a \$ 10.50 fee). Cemig seeks to deploy measures to mitigate this impact, setting targets to reduce emissions and establishing assessment criteria for new acquisitions, which consider the carbon risk in due diligence operations, immediately minimizing the probability and magnitude of the risk. Another way to mitigate this risk is by participating in Fiemg's Climate Change Working Group, where the company monitors the actions of PMR Brazil Project, which aims to discuss the convenience and opportunity of including emissions pricing (via tax and/or carbon market) in the package of instruments aimed at implementing the National Policy on Climate Change (PNMC) after 2020
Technology	Relevant, always included	Sped-up Technological Advance: The electricity sector has been constantly undergoing technological changes that impose an ability to adapt more and more quickly on the sector's players. The Company believes loss of market, customers, and consequently revenue, is the main potential impact of this risk. The company may have its business impacted by new technologies in the medium and long term, if it does not develop strategic partnerships or fails to implement technological changes to its services. Cemig seeks to implement measures to mitigate this impact by investing in research, development and innovation, always aiming to continuously improve its processes, reduce its emissions and prepare for the effects of climate change - considering energy alternatives and energy efficiency. The company defined a medium and long-term strategic initiative to explore new technologies and opportunities, such as smartgrid, hybrid generation, energy storage, "electrical stations", digitalization, and others, in order to mitigate this risk and leverage opportunities. As a way of making this strategic initiative feasible, Cemig issues R&D bid notices annually focusing on mapped opportunities. In 2019, Cemig continued its R&D investments, carrying out the 2018 projects and opening two new calls for tenders for electric mobility and alarm for dam emergencies.
Legal	Not relevant, included	Legal risks in relation to climate change have been included in the scope of the corporate assessment of risks related to climate change. However, they were considered not relevant, since in Brazil there is still no specific applicable legislation. In addition, Cemig deactivated its only Thermal Power Plant (TPP Igarapé) in 2019. It should be noted that the concession for TPP Igarapé would expire only in August 2024, but Cemig was able to anticipate its termination, ending operations in late 2019.
Market	Relevant, always included	Cap-and-Trade schemes: The establishment of a cap-and-trade GHG emissions trading market in Brazil may lead to the need for more planning by Cemig to meet market-regulations specific, especially concerning monitoring and verification emissions. To mitigate this risk, Cemig tries to identify projects that produce carbon credits and long-term contracts with verifying and certifying companies, thus reducing the likelihood of this risk for the Company becoming actual. Besides, when assessing the acquisition of projects that use fossil fuels, Cemig makes internal analyzes on the carbon risk and its financial impact for the Company; that is, the financial risk of the project in a possible future pricing scenario for emissions of GHG in Brazil. The company participates in CDP's Benchmark Club Program, which allows for an improvement in its internal practices and review of its GHG emission reduction goals. Another way to mitigate this risk is by participating in Fiemg's Climate Change Working Group, where the company monitors the actions of PMR Brazil Project, which aims to discuss the convenience and opportunity of including emissions pricing (via tax and/or carbon market) in the package of instruments aimed at implementing the National Policy on Climate Change (PNMC) after 2020
Reputation	Relevant, always included	Image and Repute: Cemig assesses the impact of image and reputation on all its strategic risks prioritized by the Board of Directors, the so-called Top Risks. Specifically regarding the image and reputation aspect, the impact of risks can be rated in one of the 6 ranges. These ranges go from very low (possible exposure among sector employees, but reversible via actions to be taken by the process manager) to catastrophic (National negative exposure to regulators, financial institutions, customers, society, opinion makers, the market, and the media). Should Cemig need to expand its energy supply by means of thermal plants powered by fossil fuel, it may be criticized by society, thus impacting the brand value. This impact may be even greater, as it leads to the worsening of Cemig's sustainability indicators, causing the company's score to be reduced in questionnaires such as ISE (B3's Corporate Sustainability Index) and DJSI (Dow Jones Sustainability Index). In an extreme case, this risk could lead to Cemig not being included in the portfolios of these sustainability indexes in a given year, resulting in a drop in market value and a deterioration of the company's reputation with investors.
Acute physical	Relevant, always included	Infrastructure damage: Intensive rainfall in a short time period, together with windstorms and lightning, can cause physical damage to the facilities that convey and distribute power, causing them to be unavailable and increasing Cemig's costs due to refunding to consumers because of power outages (DEC and FEC indicators). These phenomena are increasingly associated with the effects of an unfavorable microclimate, typical of large urban centers. Management methods seek to reduce the magnitude of this risk through in the medium term through preventive adaptation) measures, such as the management of urban tree coverage through pruning, the operation of weather stations and a weather radar - which predicts the occurrence and intensity of storms more accurately - and an emergency plan with the allocation of maintenance teams for the speedy restoration of the power supply. Besides, Cemig also carries out works on its distribution system (expansion, reinforcement, renovation, and upgrading of assets such as substations and distribution lines) in its distribution system. For the fifth five-year investment cycle, in the period from 2018 to 2022, as per the industry regulations, R\$ 6 billion in funds were approved, which are distributed among the several macro-projects. In 2019, the Company realized approximately R\$ 971.3 million in cash (products and services).

Chronic physical	Relevant, always included	Mudança no padrão de precipitação: Mudanças climáticas podem provocar mudanças nos padrões sazonais de chuvas, com eventos extremos de chuvas e secas, mudanças na distribuição Change in the rainfall pattern: Climate change can cause change in seasonal rainfall patters, with extreme rainfall and drought events, changes in geographic distribution and average values of precipitation, thus impacting the amount of water that gets to the plants' reservoirs. As Cemig's electricity production comes mainly from hydraulic sources, these changes may cause a decrease in its generation capacity. Historically, the Company has been experiencing the impacts of these risks in the past 05 years due to water scarcity in the watersheds it has hydroelectric generation projects in. Actions taken to mitigate this risk are linked to expansion of its operations to other regions of Brazil, with hydrographic basins of greater water availability, investment feasibility analysis considering the criteria related to water availability, maintenance and operation of the hydrometeorological network, and investments in diversification of the power generation matrix, such solar and wind energy. Also, management of the hydrological risk is carried out considering randomness of climatic phenomena, without taking the effects of climate change into account. For that, Cemig has a structure fully dedicated to the matter, supporting decisions of the Company risk management committees, whose purpose is efficiently treating corporate risks involving operational, commercial, financial, and regulatory aspects of Cemig Group's companies, especially in the sectoral scenario of tariff adjustment and hydrological restrictions. Cemig also participates in the Energy Reallocation Mechanism (MRE), whose purpose is to share the hydrological risks of power plants in situations of high inflows and generation and that transfer power to plants in situations of low inflows and generation. Changes in medium temperature: Climate change may cause, indirectly, increase some risks to the Energy Transmission System, as prolonged drought conditions maximize the risk of fires. Fires within right-of-way lanes can cause transmission lines to become unavailable. To mitigate this risk, Cemig continually inspects and cleans the right-of-way lanes of its transmission lines (always limited to a minimum removal of vegetation, avoiding cutting in places where there is no interference with those lines).
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## C2.3

**(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?**

Yes

## C2.3a

**(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.**

### Identifier

Risk 1

### Where in the value chain does the risk driver occur?

Direct operations

### Risk type & Primary climate-related risk driver

Chronic physical	Changes in precipitation patterns and extreme variability in weather patterns
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### Primary potential financial impact

Other, please specify (Mismatch in Cemig D cash flow due to an increase in energy purchase prices)

### Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

### Company-specific description

The energy purchase contracts signed in energy auctions by CEMIG D have their prices linked to some variables that cannot be controlled, such as adverse hydrological conditions and the shutdown of the Igarapé thermal plant before the expected time. Although eventual increases in energy purchase costs resulting from the conditions mentioned above are passed on to Cemig D in tariff adjustments, this situation may cause cash flow mismatches, with a negative impact on CEMIG's financial conditions.

### Time horizon

Short-term

### Likelihood

Likely

### Magnitude of impact

High

### Are you able to provide a potential financial impact figure?

Yes, an estimated range

### Potential financial impact figure (currency)

<Not Applicable>

### Potential financial impact figure – minimum (currency)

150000000

### Potential financial impact figure – maximum (currency)

500000000

### Explanation of financial impact figure

Purchase prices of energy have been defined, since 2005, in open auctions with an advance of 4 to 6 years, and the traded energy is valid for 20 to 30 years. Due to unexpected hydrological conditions, the same amount of energy sold at present may change prices in the future. As the amount has already been paid by Cemig D, if this happens, the generating company will supply less energy, thus causing a mismatch in Cemig D's cash flow. As of January 2015, Aneel implemented the Tariff Flag system. This system increases the final customer tariff when the generator system undergoes adverse hydrological conditions, thus passing on part of the costs to these customers faster. Even with this mechanism in place, there is a risk that energy purchase prices will increase so, that the Company's cash will be under pressure until the next tariff adjustment. The financial impact estimate was considered based on Cemig's Corporate Risk Matrix, using the Financial aspect in its number 4 (High Impact) intensity, since it may prove difficult for the company to recover within the year (as explained in Cemig's Risk Matrix). Such a case occurred in December 2018. This value can be broken down into two components: Settlement Price for Differences or PLD (transfer of funds or penalties from ANEEL to those that generated respectively more or less than was aligned through the Physical Guarantee) and Physical Guarantee Adjustment Factor - GSF (readjustment of the Physical Guarantee of the plants if they deliver less than was aligned, in order to update the conditions of the generating complex). In this case, 100% = 75% PLD + 25% GSF.

### Cost of response to risk

1540000



**Description of response and explanation of cost calculation**

Cemig has a specific organizational structure fully dedicated to managing the purchase and sale of energy. It has the Energy Risk Management Committee - CGRE intended to minimizing the risks in the purchase and sale of energy contracts, in addition to mitigating the risk of exposure in the short term from adverse hydrological conditions. Management cost is calculated based on the personnel costs of the tariff team. Cemig has seven employees in the tariff team and the company cost for each employee is R\$ 220,000.00. Thus, the management cost was raised by the formula:  $7 \times R\$ 220,000.00 = R\$ 1,540,000.00$ .

**Comment**

N/A

**Identifier**

Risk 2

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type & Primary climate-related risk driver**

Acute physical	Increased severity and frequency of extreme weather events such as cyclones and floods
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**Primary potential financial impact**

Other, please specify (Increase in operational costs due to refunding to consumers because of power outages. )

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**Company-specific description**

Intensive rainfall in a short period, together with windstorms and lightning, can cause physical damage to the facilities that convey and distribute power, causing them to be unavailable and increasing Cemig's costs due to refunding to consumers because of power outages. To assess effectiveness of actions and initiatives carried out regarding energy quality, Cemig uses the DEC (Equivalent Interruption Duration per Consumer Unit) and FEC (Equivalent Frequency of Interruption per Consumer Unit) indicators. In 2019, approximately R\$ 50 million was paid in compensation to Cemig's consumers for breach of individual electricity supply continuity indicators. In 2019, this compensation was 8.22% higher than in 2018. These phenomena are increasingly associated with the effects of an unfavorable microclimate, typical of large urban centers.

This kind of event can lead to an increase in indicators measuring energy supply quality. Extrapolation of DEC and FEC indicator limits causes a risk to the Company.

Failure to meet the regulatory targets for quality indicators for 2 consecutive years or in the fifth historic year may lead to the filing of the concession forfeiture procedure by Aneel thus involving the risk of loss of the concession.

**Time horizon**

Medium-term

**Likelihood**

Virtually certain

**Magnitude of impact**

Medium-low

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

50000000

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

Costs of R\$ 50,000,000.00 correspond to the following combination of costs: compensation costs (ANEEL penalty) due to the violation of system continuity indicators by the DIC (Individual interruption duration per consumer unit), FIC (Frequency of individual interruption per consumer unit), DMIC (Maximum duration of continuous interruption per consumer unit or connection point) and DICRI (Duration of individual interruption occurred on a critical day by consumer unit or connection point). In this case, the amount of R\$ 50,000,000.00 = DIC, FIC and DMIC compensation (monthly: R\$ 36,100,000.00, 00 + quarterly: R\$ 5,500,000.00 + annual: R\$ 5,500,000.00) + DICRI compensation (monthly: R\$ 2,900,000.00).

**Cost of response to risk**

199812000

**Description of response and explanation of cost calculation**

Management methods seek to reduce the magnitude of this risk through in the medium term through preventive adaptation measures, such as the management of urban tree coverage through pruning, the operation of weather stations and a weather radar - which predicts the occurrence and intensity of storms more accurately - and an emergency plan with the allocation of maintenance teams for the speedy restoration of the power supply. Also, Cemig runs the Distribution Development Plan - PDD, which consists of undertaking projects linked to the electric power system and associated with the expansion, boosting, refurbishing and renovation of Cemig D assets, such as substations and distribution lines. In 2019, R\$ 971.3 million was invested in PDD. Generation costs are not solely to mitigate this risk, but also to try and increase energy supply to customers. To calculate the management cost, investments in expansion and reinforcement in high voltage (R\$ 104.3 million), reform of the high voltage system (R\$ 4.5 million), reinforcement of medium and low voltage networks (R\$ 50.1 million) and network renovation in medium and low voltage (R\$ 40.9 million) were considered. Thus, R \$ 199.8 million = 104.3 + 4.5 + 50.1 + 40.9 (in R \$ million). Namely, the amount of R\$ 199.8 million is equivalent to 20.6% of the total invested in 2019.

**Comment**

Via the Distribution Development Plan - PDD, Cemig D prioritizes investments to be made by the Distributor Utility referring to BRR - Regulatory Remuneration Base, and the respective prudent management of resources in the current tariff cycle, with the objective of increasing the availability of power on a continuous basis, with quality, safety and in the amount required by customers, thus promoting social and economic development in Cemig D's concession area.

**Identifier**

Risk 3

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type & Primary climate-related risk driver**

Emerging regulation	Carbon pricing mechanisms
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**Primary potential financial impact**

Other, please specify (Increased operating costs)

**Climate risk type mapped to traditional financial services industry risk classification**

&lt;Not Applicable&gt;

**Company-specific description**

Despite having a low carbon energy matrix, Cemig operated the Igarapé thermal plant until 2019 (former nameplate capacity, 131 MW), which was fossil-fuel-fired but was decommissioned. If carbon taxation is established in Brazil, there is a risk for Cemig, should they plan to expand their power generation business in the future using fossil-fuel-fired thermal plants.

**Time horizon**

Medium-term

**Likelihood**

About as likely as not

**Magnitude of impact**

Medium-high

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

333867704.76

**Potential financial impact figure – minimum (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – maximum (currency)**

&lt;Not Applicable&gt;

**Explanation of financial impact figure**

Coverage of the data provided for the risks from changes in the legislation covers the Generation business area, as, in the event of the establishment of emission taxation, this will probably affect solely the thermal plants, not other Company businesses. In 2019 Cemig had only 1 thermal plant that operated at a higher rate than previous years in order to consume all the fuel in stock and then decommission the project. To calculate the potential financial impact, a tax estimate of \$ 10.50/tCO<sub>2</sub>e was used; the dollar was quoted at R\$ 4.18, together with total Cemig scope 1, 2 and 3 emissions in 2019, not counting TPP Igarapé emissions, which amounted to 7,606,919.68 tCO<sub>2</sub>e. Thus, the reported value was calculated as follows: R\$ 333,867,704.76 = 7,606,919.68 tCO<sub>2</sub>e \* US\$ 10.50/ tCO<sub>2</sub>e x R\$ 4.18/ US\$. Some studies carried out by the Brazilian government indicate that NDC will only be possible if the carbon tax is priced at around \$ 10.00/tCO<sub>2</sub>e. Estimating the financial implications can be complex, as it depends on how the legislation will be reduced for each sector.

**Cost of response to risk**

450000

**Description of response and explanation of cost calculation**

Cemig assesses the risk of carbon taxation in due diligence operations, records corporate GHG emissions using the Emissions Inventory and lays down targets for reducing GHG emissions. Besides, when assessing the acquisition of projects that use fossil fuels, Cemig makes internal analyzes on the carbon risk and its financial impact for the Company; that is, the financial risk of the project in a possible future pricing scenario for emissions of GHG in Brazil. In the latest assessment made by Cemig, different scenarios of energy generation were considered in the Brazilian electric matrix. To calculate the financial impact of carbon pricing on these assessed projects, the energy to be generated and the GHG emission were calculated, considering each scenario, with GHG emissions times the internal carbon price. The results were included in the project financial feasibility analysis and incorporated as operating costs. Applying this evaluation criterion for Thermal Power Plant (TPP) Igarapé, it was observed that the decommissioning of the plant carried out at the end of 2019 brought to Cemig a benefit of reducing the carbon cost of the company's operations. The value used in the pricing of carbon in projects to be potentially acquired that use fuels is \$ 10.50/tCO<sub>2</sub> (internal price adopted by Cemig, based on a basket of carbon price values that considers the following parameters: (i) geographical location, based on prices in countries in the same region as Brazil (Latin America) and (ii) sectorial parameter, based on prices practiced by companies in the same sector as Cemig (companies from Brazil and other countries). Through these actions, the Company expects a decrease in the taxation risk magnitude when the new regulations are implemented. Risk response costs are associated with maintaining the environmental team at Igarapé Thermal Power Plant in 2019 and conducting Company emission inventories. Risk response costs (R\$ 450,000.00) are associated with maintaining the environmental team at TPP Igarapé in 2019 (R\$ 420,000.00) and carrying out Company emissions inventories (R\$ 30,000.00).

**Comment**

The costs will remain as the risk persists

**Identifier**

Risk 4

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type & Primary climate-related risk driver**

Chronic physical	Rising mean temperatures
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**Primary potential financial impact**

Other, please specify (Break in energy supplying)

#### Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

#### Company-specific description

Climate change may cause an increase in average temperatures and changes in rainfall and drought regimes. In addition, they may also cause storm and high-speed wind events. Indirectly, such consequences of climate change may increase some risks to the Energy Transmission System, as prolonged drought conditions maximize the risk of fires, while high wind speeds can impact the physical structures of transmission lines. Fires within right-of-way lanes can cause transmission lines to become unavailable. Cemig areas of operation that could be most affected by forest fires are Triângulo Mineiro and the metropolitan regions in the state of Minas Gerais.

#### Time horizon

Medium-term

#### Likelihood

More likely than not

#### Magnitude of impact

Low

#### Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

#### Potential financial impact figure (currency)

860930.84

#### Potential financial impact figure – minimum (currency)

<Not Applicable>

#### Potential financial impact figure – maximum (currency)

<Not Applicable>

#### Explanation of financial impact figure

Aneel Normative Resolution 729/16, which lays down provisions related to quality of the public electricity transmission service, associated with availability and the operational capacity of facilities, determines discounts for a variable portion caused by fires that produce outages in Transmission Lines. In 2019, R\$ 88,992.07 were deducted, referring to variable portion discounts caused by fires that produced outages in 5 power transmission lines. In addition, in 2019, 4 500-kV structures from Água Vermelha TL - São Simão (Cemig GT) collapsed from winds in the Iturama region - MG. To correct the problem, the structures were replaced. As a result, R\$ 624,385.57 was spent on expenses (hours worked, food, lodgings) and R\$ 147,553.20 were invested (4 new structures). So, the value of the financial impact is the sum of the three above amounts.

#### Cost of response to risk

3095924.42

#### Description of response and explanation of cost calculation

Cemig continuously inspects and cleans its right-of-way lanes (limited to minimal vegetation removal, avoiding cutting in places where there is no interference with the transmission lines) of its transmission lines to maximize the safety and availability of transmission functions. In 2019, for example, right-of-way lanes were cleaned in a total area of 29,284,969 m<sup>2</sup> along Cemig's structures and transmission lines, in addition to reviewing projects and changing the structure of the towers.

#### Comment

The management costs are annual and are associated with the process of cleaning the right-of-way along the structures and transmission lines. The reported financial impact refers to 5 TL disconnections during 2019, among the several transmission lines Cemig has. The management cost is greater than the financial impact, because it refers to the maintenance of Cemig's entire transmission system.

## C2.4

### (C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes

## C2.4a

### (C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

#### Identifier

Opp1

#### Where in the value chain does the opportunity occur?

Direct operations

#### Opportunity type

Products and services

#### Primary climate-related opportunity driver

Other, please specify (Sale of CER in a cap-and-trade system)

#### Primary potential financial impact

Other, please specify (Increased revenue through new solutions for adaptation needs (e.g., insurance risk pass-on products and services).)

#### Company-specific description

Compliance with regulatory requirements and the coming up of new international agreements may create opportunities for Cemig, as the Company, by having a predominantly renewable energy matrix (2019 installed capacity: 99.1% hydraulic and 0.7% wind and solar) and with low carbon emissions, is better prepared than its competitors to adapt to that scenario. The establishment of a cap-and-trade emissions trading market in Brazil or worldwide, along the lines of the CDM, for example, could lead Cemig to position itself as an important provider of emission reduction certificates. This opportunity could lead to an increase in revenue at Cemig.

#### Time horizon

Long-term

**Likelihood**

Very likely

**Magnitude of impact**

Medium

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

336336.55

**Potential financial impact figure – minimum (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – maximum (currency)**

&lt;Not Applicable&gt;

**Explanation of financial impact figure**

Cemig has 1,225,026 credits issued under CDM in Small Power Plant (SPP) Cachoeirão and Hydro Power Plant (HPP) Santo Antônio plants. However, in both cases, Cemig does not have operational control, and therefore, credit management is not exclusive to the company, requiring alignment with partners (in SPP Cachoeirão there are 167,097 credits, where there is a 49% shareholding in Cemig, while in HPP Santo Antônio there are 1,057,929 credits with a 15% shareholding in Cemig). The financial impact was calculated based on the possibility of these credits being traded at EUR 0.31 per credit (price updated at the end of 2019), with a euro quotation at R\$ 4.51. Therefore, R\$ 336,336.55 = [(167,097 credits x 49%) + (1,057,929 credits x 15%)] \* EUR 0.31/ credit \* R\$ 4.51/ EUR.

**Cost to realize opportunity**

102400

**Strategy to realize opportunity and explanation of cost calculation**

Cemig has professionals trained in the identification of projects that generate carbon credits and has long-term contracts with verifying and certifying companies, thus increasing the possibility of leveraging this opportunity. Cemig already has emission reduction CDM projects registered with UNFCCC. In 2019, these projects were monitored (1,225,026 carbon credits). The associated costs are those related to the monitoring (R\$ 80,000.00 per project) and audits (R\$ 80,000.00 per project) necessary for the validation and trade of credits generated by two Cemig projects (SPP Cachoeirão, 167,097 credits, where Cemig has a 49% equity interest, and HPP Santo Antônio, with 1,057,929 credits, with a 15% Cemig equity interest). So R\$ 102,400.00 = [(R\$ 80,000.00 + R\$ 80,000.00) x 49%] + [(R\$ 80,000.00 + R\$ 80,000.00) x 15%]

**Comment**

Costs are not annual and will occur when audits are performed

**Identifier**

Opp2

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Markets

**Primary climate-related opportunity driver**

Other, please specify (Energy consumption increase due to average temperature increase)

**Primary potential financial impact**

Other, please specify (Revenue increase)

**Company-specific description**

Probable increase in average temperatures will cause changes in consumption patterns, such as an increase in the use of ventilation and cooling systems, resulting in an increased energy demand. A study conducted by Rodrigues et al. (2013) assessed the possible impact of climate change on power home demand, based on average quarterly temperature increase forecasts according to the GHG emission scenario in the 4th IPCC Report. The results suggest power home demand in Brazil may increase as a response to the expected temperature increase. Considering Cemig has over 6.9 million home consumers in the State of Minas Gerais, leveraging this opportunity will cause a substantial increase in Company revenues.

**Time horizon**

Medium-term

**Likelihood**

About as likely as not

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

1787820235.79

**Potential financial impact figure – minimum (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – maximum (currency)**

&lt;Not Applicable&gt;

**Explanation of financial impact figure**

According to the study by Rodrigues et al (2013), the increase in home power demand will be of about 27% by 2050. Considering that Cemig's sale to residential customers was 10,538.34 GWh in 2019, with an increase of 27% in 2050 the sale will be equivalent to 13,383.69 GWh. Thus, the additional portion will be 2,845.35 GWh. Using the average value of the current tariff of R\$ 0.62833/ kWh (Residential Normal 2019 tariff, green flag), the possible financial impact was calculated. Therefore, R\$ 1,787,820,235.79 = 2,845.35 GWh x R\$ 0.62833/ kWh x 1,000,000 (conversion GWh to kWh)

**Cost to realize opportunity**

1234240392.69

**Strategy to realize opportunity and explanation of cost calculation**

In order to prepare for the increase in energy demand, Cemig has been expanding the availability of power distribution infrastructure to meet this market growth, by means of works to boost substations and distribution lines and grids. These actions help both increase the probability of leveraging this opportunity and its magnitude. The investment cycle is a five-year one, as per sector regulations. The amount calculated to materialize the opportunity in 2019 is composed as follows: R \$ 1,234,240,392.69 (100%) = 52.2% in High Voltage expansion and reinforcement + 2.3% in High Voltage reform + 25.0% in Medium and Low Voltage reinforcement + 20.5% in Medium and Low voltage reform. Total approved investment amount for PDD in the 2018-2022 cycle is R\$ 6 billion. From that amount, R\$ 971 million were invested in 2019 in the following macroprojects: - High voltage expansion and boosting; - Consumer and accessing user service (Cemig's Participation); - High voltage system renovation; - High voltage line operation and maintenance; - Boosting of medium and low voltage grids; - Care to the medium and low voltage urban market; - Care to the medium and low voltage rural market; - Supplemental Program (Cemig's Participation) in low and high voltage; - Third-Party Safety (Cemig's Participation) - Renovation of medium and low voltage grids; - Operation and maintenance of medium and low voltage; - Change of Measurement/Border Measurement; - Environment; - Medium Voltage Automation Master Plan; - Telecommunications;

**Comment**

Via the Distribution Development Plan - PDD, Cemig D prioritizes investments to be made by the Distributor Utility referring to BRR - Regulatory Remuneration Base, and the respective prudent management of resources in the current tariff cycle, with the objective of increasing the availability of power on a continuous basis, with quality, safety and in the amount required by customers, thus promoting social and economic development in Cemig D's concession area. The PDD consists of investment projects linked to the electric power system and associated with the expansion, boosting, refurbishing and renovation of Cemig D assets, such as substations and distribution lines.

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**Identifier**

Opp3

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Resource efficiency

**Primary climate-related opportunity driver**

Other, please specify (Sale of energy efficiency projects )

**Primary potential financial impact**

Other, please specify (Revenue increase for the Company and pushback of investments in energy generation)

**Company-specific description**

In a scenario of larger corporate investments in energy efficiency aimed at reducing power consumption and, consequently, GHG emissions, CEMIG SIM subsidiary will possibly have an increased demand for its services, including deploying projects for use of lighting with LED technology, cogeneration, distributed generation, and other energy solution services. It must be stressed that these projects are carried out via performance agreements where CEMIG SIM contributes with the required funds and recoups its investment by means of savings from the project. In this context, CEMIG SIM may also have an increase in demand for consulting services for deployment of an Energy Management System based on an ISO 50001.

**Time horizon**

Short-term

**Likelihood**

Very likely

**Magnitude of impact**

Low

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

10023041.5

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

The amount presented is Cemig SIM's gross operating revenue from distributed generation and energy solution services.

**Cost to realize opportunity**

9612252.78

**Strategy to realize opportunity and explanation of cost calculation**

Cemig SIM was established in October 2019 from the merge of the operations of Efficiencia and Cemig GD companies, to work in the, distributed energy, energy efficiency and energy solution market. Besides branding and marketing strategy focused on retail and digital transformation of the electric sector, SIM's organizational culture, strongly innovative and technological in nature, is being boosted so customers are always at the center of decisions. In 2019, Cemig SIM provided 1,456 customers with the chance to consume 2,342 MWh/month, with costs averaging 20% lower than those of the local energy concessionaire. Energy was generated by three photovoltaic plants (Janúba, Corinto and Manga) In energy solutions, Cemig SIM will, in 2020, implement photovoltaic plants for medium voltage customers, in addition to energy efficiency projects. Business models for the energy storage, electric mobility, and cogeneration markets are also being developed. The costs are annual and exclusively associated with the maintenance of the CEMIG SIM team, without including investment costs in energy efficiency projects.

**Comment**

The associated costs will exist whenever that opportunity exists.

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### C3. Business Strategy

#### C3.1

**(C3.1) Have climate-related risks and opportunities influenced your organization's strategy and/or financial planning?**

Yes

#### C3.1a

**(C3.1a) Does your organization use climate-related scenario analysis to inform its strategy?**

Yes, qualitative and quantitative

#### C3.1b

**(C3.1b) Provide details of your organization's use of climate-related scenario analysis.**

Climate-related scenarios and models applied	Details
RCP 2.6 RCP 4.5 RCP 6 RCP 8.5 Other, please specify (SRES)	AR4 (CMIP3) and AR5 (CMIP5) global climate models from IPCC were used in development of Strategic R&D Project n°010 / 2008 "Effect of climate change on the hydrological regime of river basins and on the assured energy of hydroelectric projects". The work was carried out on the hydrographic basins of the Paraná, Xingu, Tocantins, São Francisco, Uruguay and Iguazu rivers). Integration of the CMIP3 model was done using the SRES – Special Report Emission Scenarios. SRES includes scenarios that consider the development of society, population growth, and intensity of GHG emissions. For integration of CMIP5 models, the scenarios used are those from RCP – Representative Concentration Pathways, which represent radiative forcing. From the model climate variables, forecasts for rainfalls, soil use, and water demand for urban and rural use were converted into inflows into the National Interconnected System plant reservoirs. Assured energies for each scenario were calculated, considering the existing and future generating complex (the set of plants expected to be operating in 2030, according to PNE2030 from the Energy Research Company). The assured energy calculation was done for the 2040, 2070, and 2100 timeframes, so the results of the effort could serve as a long-term planning tool, allowing climate change scenarios to be taken into account. The result of the work indicates a reduction (mainly in the Amazon and Northeast of Brazil) and an increase in rainfall in the South Region. Assured energies calculated from climate model information reflect the trend noticed for inflows. Assured energy reduction average for the existing generating complex reaches 15%, whereas the one for the future complex reaches 25% for the year 2041 and on. It can be concluded that the Brazilian generating complex has decreased its regularization capacity in face of the system energy demand in the past decades, and is increasingly sensitive to rainfall variations. Another project developed by Cemig was the R&D GT 0552 - Evaporation of the HPP Funil reservoir: Water Footprint Characterization. Three HPPs installed in cascade were evaluated and the following impacts were considered: reduction/increase in energy production potential, impact on the water footprint, possible interruptions in the production of electricity due to low water availability. Climate change impacts on runoff simulation considered scenarios RCP 4.5 and 8.5, simulated by the Eta-HadGEM2- ES Eta-MIROCC5 regional climate models. Control was the assessed period (1961-2005 2007-2040, 2041-2070, 2071-2099.) For Eta-HadGEM2-ES, the largest reductions in monthly average outflows were noticed from 2007-2040 under RCP 4.5 and from 2071-2099 period under RCP 8.5. For Eta-MIROCC5, the largest reductions in monthly average outflows were noticed from 2071-2099 under RCP 4, and from 2007-2040 under RCP 8.5. Forecast for the most critical impact on energy generation potential is expected during the 2071-2099 period at Itutinga Plant, for Eta-HadGEM2-ES under influence of RCP 8.5. The results indicate the plant should not operate 69.1% of the time, as minimum generation (9.7 MW) should not be reached. For Eta-MIROCC5, during 2071-2099 under RCP 4.5, results indicate the plant should not operate 10.5% of the time. The result of these scenarios contributed for the development of short-term (2019-2020) initiatives for the purchase of assets from wind and solar energy agreements in place and the medium- and long-term (2021 to 2040) initiative for expanding wind, solar, and natural gas thermal generation capacity. This way, the company keeps diversifying its generating complex.

#### C3.1d

**(C3.1d) Describe where and how climate-related risks and opportunities have influenced your strategy.**

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	As its production of power is basically hydraulic, Cemig acknowledges the risks inherent to climate change can cause a decrease in generation capacity and a significant impact on energy supply. This way, Cemig, among other risks, works preventively by monitoring the following changes: -Rainfall pattern: Cemig has a specific organizational structure supporting risk management and decision-making both for trade and operation of assets. Cemig also participates in the Energy Reallocation Mechanism (MRE), whose purpose is to share the hydrological risks of power plants in situations of high inflows and generation and that transfer power to plants in situations of low inflows and generation. -Average temperature: Cemig continually inspects and cleans the right-of-way lanes of its transmission lines so as to maximize the safety and availability of transmission and distribution functions Allotment(always limited to a minimum removal of vegetation, avoiding cutting in places where there is no interference with transmission and distribution lines). -Rainfall and drought extremes: Management methods seek to reduce the magnitude of this risk through preventive adaptation such as the management of urban tree coverage through pruning, the operation of weather stations and a weather radar - which predicts the occurrence and intensity of storms more accurately - and an emergency plan with the allocation of maintenance teams for the speedy restoration of the power supply. -Consumer behavior: That risk is managed by realization diagnosing the electrical system for the need for expansion works, monitoring of operating conditions, and reprioritization of works. Cemig estimates the magnitude of that impact will be average, occurring mainly in the years of low inflows into the reservoirs. One of the ways to mitigate that risk at hydropower plants is via the Plant Energy Planning Efficiency– IEPE stands out. It measures the efficiency of the energy operation of Cemig's hydroelectric plants by comparing the verified energy generation with the optimal generation, considering the observed discharges, the maintenance of generating units, and compliance with operational restrictions. Regarding Products and Services, the time horizon considered is between short and medium term, as there is an internal study by Cemig to review the theme in the period from 2020 to 2025.
Supply chain and/or value chain	Yes	Possible losses from an increase in wind, flood, and drought intensity may indirectly affect Cemig's energy business operation when they impact the supplier chain, especially those directly involved in infrastructure deploying/maintenance (transmission and distribution). This way, Cemig constantly monitors its supplier chain by keeping a high degree of demand and care based on mapping of potential risks and probabilities of their occurring, and the tangible and intangible impacts calculated at financial values strategic for the company. Besides that, Cemig tries to align suppliers and contractors with its vision of sustainability, its commitments and corporate values. Among these corporate values, Cemig includes Commitment to Climate Changes into its Supply Policy. Cemig estimates this impact may occur at the medium term, and its magnitude will be low, as the company has a supplier ranking system based on social and environmental criteria (102 ranked in 2018), together with raking of critical suppliers (117 ranked in 2018), totaling 1,438 active suppliers. Critical suppliers are those whose goods or services have a significant impact on the company competitive advantage, market success or survival. Another way of mitigating that risk is through the development of the supply chain smart management R&D that is being carried out by Mackenzie University together with the European Institute of Purchasing Management – EIPM. The first stage of that project is geared at the preparation of a Kraljic matrix, intended to enhance risk management and supplier ranking. Deadline for completion of that project is 2 years. Regarding Supply Chain, the time horizon considered is medium term. A strategic decision by Cemig influenced by the climate issue is to apply a socio-environmental questionnaire to suppliers (started in 2019, but is expected to be applied in 2020). When hired, suppliers will respond on emissions management and will be evaluated with a performance score. Now, the applicators of the form are in training.

Investment in R&D	Yes	As a measure of its efforts in innovation, the Company has an indicator called INOV, which represents the relationship between the investments made in R&D projects and other investments in innovation in the current year, in relation to its net operating revenue. The target for 2019 was for this indicator to amount to 0.30%. However, the result exceeded the target and indicated that 0.70% of the year's net revenue was allocated to research, development, and innovation. This result follows the increases seen in recent years: 0.51% and 0.49% in 2018 and 2017. The development of innovation in products and processes is responsible for the creation of goods and services capable of boosting availability of assets, reducing final customer service time, speed up and streamline access to the utility and its services, enhance personal and system safety, develop new work tools and more cutting-edge equipment, and other benefits. This sort of innovation typically takes place at Cemig's technical areas using the Technology Strategic Management – GET methodology. The Research and Development. (R&D) program can be highlighted as one of the major Cemig innovation vectors. In that program, initiatives are carried out that go from incremental technology projects - responsible for bringing in operational efficiency gains and cost savings - down to those of a radical or disruptive nature, capable of providing radically new products that even impact the market. In 2018, the R&D program was restructured based Cemig 4.0 Digital Technology Innovation Strategic Plan. Cemig 4.0 is a program geared at positioning the Company among the industry companies capable of responding to new global trends and demands on energy systems. It is via this program that Cemig should explore opportunities and challenges of the new business models in the segment. For 2019, a strategic decision by Cemig was to base R&D programs on Decarbonization (among other issues), reflecting on topics such as electric mobility, renewable energy, distributed generation and energy storage. In terms of time horizon, short and medium term are considered for the duration of the projects.
Operations	Yes	Cemig promotes initiatives that enable the accurate management of the possible impacts on its operation, among which the following stand out: Hydrometeorological monitoring in a preventive way, it invests in practices that place it in a situation of greater security given the several possible scenarios, using modern techniques and equipment, such as the Storm Location System, a Telemetry, and Hydrometeorological Monitoring System, mathematical models of hydrological simulation and weather and climate forecasting. - Dam Safety: The process aimed at guaranteeing the safety of the dams operated and maintained by Cemig uses in all its stages a methodology supported by the best national and international practices. and complies with Federal Law 12,334/2010, which lays down the Brazilian National Dam Safety Policy and its associated regulations (ANEEL Normative Resolution No. 696/2015). This includes procedures for field inspections, collection and analysis of instrumentation data, drafting and updating of dam safety plans, planning and monitoring of maintenance services, analysis of results, and ranking of civil structures. Based on the ranking of the structures, the frequency of safety inspections and the monitoring routine are laid down. Each dam vulnerability is continuously automatically calculated and monitored by the Dam Safety Specialist System (Inspector). - Distribution Development Plan: The PDD consists of undertaking projects linked to the electric power system and associated with the expansion, boosting, refurbishing and renovation of Cemig D assets, such as substations and distribution lines. - Energy Alternatives: As Cemig sees it, the term "Energy Alternatives" covers the whole energy chain, including transportation, transformation, technological routes, supplying and storage, energy efficiency, and end-use of energy. As they are integral and mutually depending elements in the energy matrix, new sources and technologies, distributed generation, start grids, element vehicles, energy efficiency, and the best use of traditional energy resources make up energy alternatives. For its expertise in that theme, the Company has participated in committees and groups. The company estimates it may be impacted in the medium term, which may cause operating cost increase due to the deploying of adaptation and mitigation efforts.

### C3.1e

#### (C3.1e) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Indirect costs Capital expenditures Acquisitions and divestments Access to capital Assets Liabilities	For all the elements described, the time horizon is between short and medium term Revenues: Risks: As Cemig's power generation is basically hydraulic, the risks inherent to climate change (especially a decrease in rainfall rates, affecting the amount of water stored in reservoirs and, as a consequence, reducing power generation capacity of hydropower plants) , leading energy producers to exposure to the short term market, may cause a significant decrease in power supply; that is a high magnitude impact. This situation can directly affect Company turnover, and even give rise to court actions for any losses causes. Accidental breaks in power transmission lines due to extreme weather conditions may cause a decrease in energy availability, directly impacting turnover, and in distribution lines, causing power outages. Opportunity: increase in average temperatures may cause an increase in air-conditioning and cooling equipment, impacting energy demand and increasing turnover. Operational Costs: Risks: Possible decrease in average rainfall volume due to climate change may affect the amount of water stored in reservoirs, and thus reduce energy generation capacity of hydropower plants, leading the National Electric System to boost energy generation via thermoelectric plants, which have higher operational costs, besides increasing emissions of CO2 and other pollutants. Also, extreme weather conditions may cause accidents along power transmission lines and substations, giving rise to additional equipment maintenance/rebuilding costs. Regulatory changes can cause a cost increase if they cause an increase in taxation levied on energy generation, transmission, and/or distribution activities. Opportunity: the use of wind and/or photovoltaic generation may increase energy generation capacity from clean sources that are independent of the hydraulic component, thus reducing the need for conveying thermoelectric plant energy along the ONS. The company was impacted in low rainfall years, as 2014 and 2017; however, the Energy Relocation Mechanism ("MRE") mitigated a part of the variability impact of hydropower plant generation. When all the plants together produce less than the requirement amount, the mechanism reduces energy available at the plants, causing a negative short-term market exposure, resulting in a need for purchasing energy at the Varied Settlement Price – PLD. In years with very critical hydrology, the available energy production factor may compromise over 20% of the energy available at hydropower plants, and so its magnitude is high. Capital expenditure/bonding: Risk: Climate change determines the need for the Company to make additional investments to maintain and improve its distribution grid. The Distribution Development Program (PDD) contributes to mitigate that risk, besides meeting the increase in demand from the natural growth of the population. The company considers this impact of average magnitude, and the high, medium and low voltage boosting works account for 20% of PDD investments in 2019. Acquisitions and divestitures: Opportunity: The uncertainty regarding rainfall levels and the resulting decrease in Cemig plants' capacity to ensure generation cause a need for diversifying the Company's generation complex and foster construction/acquisition of wind farm and photovoltaic projects, technologies Cemig already has expertise in. The company considers this impact magnitude as low, due to hydrologic risk rescheduling; also, in 2018, it approved - in its multiannual business plan - a study initiative for investments in wind and solar power with a view at diversifying its generating complex. Access to capital: Opportunity: Cemig participates in several sustainability indexes and rankings (DJSI, ISE, Oekom, CDP, Sustainability, and others), which contributes to communicate the Company sustainability practices - including its actions to mitigate climate change effects - to the market, thus facilitating access to investors' capital and the money market. The company estimates it may be impacted in the long run, should its interest in non-renewable sources increase. This may cause an increase in GHG emissions, which may negatively influence the company performance in sustainability indexes. Assets: Risk: extreme climate events may result in an overload of Cemig's water reservoirs, and even damage to generation units. Cemig seeks to mitigate that risk by investing in dam safety (prevention) and also by installing a weather radar (catastrophe prevention). This impact magnitude is low, due to maintenance services at its plants. Opportunity: in order to reduce the impact of climate change, Cemig's strategic driver is an effort to diversify its energy matrix; this way, the Company has developed expertise in renewable energy generation (mainly wind and photovoltaic), in addition to constantly assessing new technologies via its Research and Development program. This expertise is an asset that can eventually be traded in the form of the sale of already-installed operating units or even the provision of services. Liabilities: Risk: Cemig's activities are capital-intensive. Naturally, the incorporation of generation assets to minimize the impact of climate change may cause the Company to incur indebtedness. The magnitude of this impact is high, due to the company's high level of indebtedness.

### C3.1f

#### (C3.1f) Provide any additional information on how climate-related risks and opportunities have influenced your strategy and financial planning (optional).

i. Climate-change-related risks and opportunities are rated and prioritized in exposure matrices by the Corporate Risk Monitoring Committee and presented to the Executive Board. These risk and opportunity assessments are therefore presented to senior management, who use them in drafting the Company's Strategic Planning. Once Cemig's strategy is defined and approved by the Executive Board, the other boards plan their activities. The Strategic Planning process is conducted by the Board of Directors, with the participation of the Executive Board.

ii. Besides, in 2019, Cemig's Sustainability Plan was developed in an integrated manner in with the involvement of several areas of the Company. Based on information obtained from internal and external analyses, the 7 most relevant themes were defined and prioritized. One of them is natural capital and climate change management. The 7 themes are broken down into 31 subthemes, which make up the Materiality Matrix of Cemig's Sustainability Plan. For monitoring, measurement and analysis of the results of Cemig's Sustainability Plan, around 50 indicators related to the topic, 5 of which relate to climate change, are being defined. Their performance will be assessed at the end of each year against the previous year, in addition to monitoring implementing and carrying out the initiatives.

iii. Aspects of climate change that have influenced Cemig's strategy:

**Development of low-carbon businesses:** Cemig has identified business opportunities and for obtaining market advantages from its low-carbon energy matrix, which are primarily aimed at i) implementing and renovating renewable source plants where Cemig already has expertise, and ii) investment in new energy sources.

**Regulatory changes:** Cemig identifies regulatory risks related to climate change, which are seriously considered in the Company's strategic decision-making. In particular, it acknowledges the commitments attributed to the energy sector in Brazil's Nationally Determined Contribution (NDC) and manages the associated risks through participation in business associations, and monitoring international negotiations and their developments at the national level. Cemig performs environmental due diligence for the acquisition of new assets (carbon risk assessment), to assess the possible financial impact of the increase in its GHG emissions in this asset, given the possibility of internalizing the costs of emissions as a result of the new regulations.

**Need to mitigate climate change:** Despite already having low GHG emissions intensity, Cemig strives to reduce its emissions, including by laying down goals to reduce emissions, power consumption, and electricity losses, taking into account the commitments in the Brazilian NDC for the energy sector. In addition, the use of an internal price for carbon in investment assessments for fossil fuel-based ventures is in line with global trends for using carbon pricing instruments as a mechanism to promote climate change mitigation.

**Need to adapt to climate change:** Cemig has a generating complex with low GHG emissions, as it is predominantly hydraulic, but it is subject to the consequences of climate change. Thus, it invests in improving the systems for forecasting climatic events, boosting the infrastructure of its plants, transmission lines, and distribution networks to deal with the consequences of these events and improving the forecast of water availability in its generating complex. . Also, it has been seeking to diversify its electrical matrix through the creation of Cemig SIM, a wholly-owned subsidiary focused on serving the distributed generation market.

**In the short term (up to five years):** Cemig invests in state-of-the-art techniques and equipment that allow better quality of forecasting intensity and location of storms. In addition, CEMIG defined two tCO<sub>2</sub>e emission targets in 2018. The first consists of an absolute target based on a combination of scope 1 and 2 emissions, while the second is an intensity target for scope 2 based on emissions from total losses in the transmission and distribution of electricity.

**In the long term (over ten years):** the need to consolidate low carbon energy matrixes has guided R&D projects, which may be implemented by Cemig on a large scale in the future. The climate change scenario opens up new business opportunities for the Company, with expectations of high demand in the long run. Cemig has Cemig SIM, which works in the development and enablement of technological solutions that foster the efficient use of energy. In addition, in its investment decisions, Cemig has taken into account the expectation of a progressive increase in NDCs ambition for Brazil, which should be reflected in stricter emission reduction targets associated with post-2025 energy.

The maintenance of a predominantly renewable matrix and the assessment of carbon risk allow Cemig to anticipate the risks associated with the increased cost of electricity generation. Also, the development of new technologies, especially for power generation from solar sources, places Cemig at the forefront of the electricity sector, allowing the incorporation of new technologies in its headquarters and the diversification of its businesses.

More substantial strategic decisions taken in 2019 by Cemig, influenced by business opportunities, leveraged by climate change:

· Actions that minimize physical risks from extreme weather events: Cemig's performance as a trader of renewable (wind and solar) energies, as seen by participation in the Auction for the Purchase of Incentivized Solar and Wind Energy. In the 30th New Energy Public Tender, held on 10/Dec/2019, 6,416.5 GWh were acquired in contracts, with supply beginning in January/2025 and lasting 20 years.

· Actions that increase low-carbon business development opportunities: In October 2019, Cemig consolidated its role in the distributed generation business through CEMIG SIM, a merger of the former Cemig Geração Distribuidora S.A. - Cemig GD and Efficientia Serviços. The company was formed with the expectation that 250 MW of installations will be carried out in the next two years.

Following a Digitization, Decarbonization, and Decentralization based strategy, Cemig has explored opportunities and challenges of the new business models in the segment. In 2019, two R&D bid notices were opened, with a focus on electric mobility and devices for individual notification in the event of dam emergencies.

## C4. Targets and performance

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### C4.1

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#### (C4.1) Did you have an emissions target that was active in the reporting year?

Both absolute and intensity targets

### C4.1a

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#### (C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

**Target reference number**

Abs 1

**Year target was set**

2018

**Target coverage**

Company-wide

**Scope(s) (or Scope 3 category)**

Scope 1+2 (location-based)

**Base year**

2017

**Covered emissions in base year (metric tons CO<sub>2</sub>e)**

713262

**Covered emissions in base year as % of total base year emissions in selected Scope(s) (or Scope 3 category)**

100



**Target year**

2022

**Targeted reduction from base year (%)**

14

**Covered emissions in target year (metric tons CO2e) [auto-calculated]**

613405.32

**Covered emissions in reporting year (metric tons CO2e)**

650456.9

**% of target achieved [auto-calculated]**

62.8952414600605

**Target status in reporting year**

Underway

**Is this a science-based target?**

No, but we anticipate setting one in the next 2 years

**Please explain (including target coverage)**

Cemig defined two tCO2 emission targets in 2018. One is the absolute target based on a combination of Scope 1 and Scope emissions. As a reference, target year 2022 and base year 2017 were set for total emissions. For scope 1 emissions, we have adopted the following criterion: maintain SF6 emission percentage at a maximum of 0.66%; having the emission factor of the TPP Igarapé at a maximum of 0.88 t CO2/MWh (2017 factor); and reducing 10% of emissions from mobile sources against the 2017 amount. Regarding scope 2 emissions, the following criterion was set: to maintain 41.334 MWh of electric energy consumption (2017 value) and to maintain total losses at 13.40% until 2022. Scope 1 emissions in 2019 were: 9,068 tCO2e from the vehicle, boat and aircraft fleet; 5,239 tCO2e of fugitive emissions of SF6 gas present in electrical equipment and also of fugitive emissions from natural gas distribution; 37,582 tCO2e from stationary combustion (mainly from Igarapé Thermal Power Plant); 49 tCO2e from agricultural emissions and land use changes, totaling 51,938 tCO2e. CEMIG's scope 2 emissions in 2019 totaled 598,518 tCO2e. Of the total Scope 2 emissions in 2019, 3,154 tCO2e resulted from energy consumption and 595,365 tCO2e (or 99.4%), resulted from electrical losses in the Transmission and Distribution systems. Also, in 2019, total losses in distribution indicator (IPTD) was 13.57% against the total energy injected into the distribution system. This result is above the established target (13.40% for 2019). Combining Scope 1 and 2 emissions, 2019 had a total of 650,456.90 tCO2e emissions.

**C4.1b****(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).****Target reference number**

Int 1

**Year target was set**

2018

**Target coverage**

Company-wide

**Scope(s) (or Scope 3 category)**

Scope 2 (location-based)

**Intensity metric**

Other, please specify (IPTD)

**Base year**

2019

**Intensity figure in base year (metric tons CO2e per unit of activity)**

598518

**% of total base year emissions in selected Scope(s) (or Scope 3 category) covered by this intensity figure**

100

**Target year**

2019

**Targeted reduction from base year (%)**

1.24

**Intensity figure in target year (metric tons CO2e per unit of activity) [auto-calculated]**

591096.3768

**% change anticipated in absolute Scope 1+2 emissions**

1.24

**% change anticipated in absolute Scope 3 emissions**

0

**Intensity figure in reporting year (metric tons CO2e per unit of activity)**

598518

**% of target achieved [auto-calculated]**

0

**Target status in reporting year**

Underway

**Is this a science-based target?**

No, but we anticipate setting one in the next 2 years

**Please explain (including target coverage)**

In 2018, Cemig set an intensity target for scope 2, based on emissions from total losses in the transmission and distribution of electricity. The following criterion was set: for each year, maintain the electric energy consumption at 41,334 MWh (same value as in 2017), as well as maintain the total loss index at 13.40% with 2017 as the base year (14.24% total losses) and 2022 as target. However, as the loss rate is proportional to the amount of energy distributed by Cemig and as it varies annually, it is also a goal that changes every year. For example, the intensity target for 2019 was to keep total Scope 2 emissions at 591,172.58 tCO<sub>2</sub>e (1.24% removed from the actual value observed that year, 598,518.28 tCO<sub>2</sub>e). In 2019, total losses indicator (IPTD) was 13.57%, against the total energy injected in the distribution system. This result is above the established target for 2019 of 13.40%. Of the total Scope 2 emissions in 2019, 0.6% - equivalent to 3,154 tCO<sub>2</sub>e - resulted from energy consumption, and 99.4% - or 595,365 tCO<sub>2</sub>e - resulted from total electrical losses. It is worth mentioning that Scope 2 is strongly influenced by the SIN emission factor, which increased by 1.35% compared to 2018, going from 0.0740 tCO<sub>2</sub>e / MWh to 0.0750 tCO<sub>2</sub>e / MWh. CEMIG's scope 2 emissions in the year 2019 totaled 598,518 tCO<sub>2</sub>e, amounting to a 15.50% increase in relation to the previous year (in 2018, 518,212 tCO<sub>2</sub>e).

C4.2

**(C4.2) Did you have any other climate-related targets that were active in the reporting year?**

Other climate-related target(s)

C4.2b

**(C4.2b) Provide details of any other climate-related targets, including methane reduction targets.**

**Target reference number**

Oth 1

**Year target was set**

2018

**Target coverage**

Company-wide

**Target type: absolute or intensity**

Intensity

**Target type: category & Metric (target numerator if reporting an intensity target)**

Resource consumption or efficiency	Other, please specify (Having a maximum SF6 emission percentage of 0.66% of installed SF6 mass (percentage relating to 2018);)
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**Target denominator (intensity targets only)**

Other, please specify (Total amount (kg) of installed SF6)

**Base year**

2017

**Figure or percentage in base year**

0.66

**Target year**

2022

**Figure or percentage in target year**

0.66

**Figure or percentage in reporting year**

0.48

**% of target achieved [auto-calculated]**

<Calculated field>

**Target status in reporting year**

Underway

**Is this target part of an emissions target?**

Sim, faz parte de uma iniciativa abrangente de eficiência operacional.

**Is this target part of an overarching initiative?**

No, it's not part of an overarching initiative

**Please explain (including target coverage)**

Despite the goal being reached in 2018, Cemig needs to keep managing and its performance on the matter, so that this value is maintained, since SF6 mass in Cemig's electrical system is expected to increase. The target was reached in 2019; the value of relative SF6 losses (emissions/total installed quantity) was 0.48%. In the Sustainability Plan completed in 2019, this indicator was being monitored. In 2018, an SF6 management procedure was developed for Cemig Distribuição as a way of standardizing fugitive emissions estimates and management of SF6-containing equipment. The company continues to develop SF6 loss mitigation practices, either by eliminating leaks or by eliminating losses in the maintenance process and investing in more efficient equipment.

### C4.3

**(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.**

Yes

### C4.3a

**(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.**

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	5	8916
To be implemented*	3	3067
Implementation commenced*	34	7348
Implemented*	36	3671
Not to be implemented	0	0

### C4.3b

**(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.**

#### Initiative category & Initiative type

Energy efficiency in buildings	Lighting
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#### Estimated annual CO2e savings (metric tonnes CO2e)

3671

#### Scope(s)

Scope 3

#### Voluntary/Mandatory

Voluntary

#### Annual monetary savings (unit currency – as specified in C0.4)

0

#### Investment required (unit currency – as specified in C0.4)

73553186

#### Payback period

No payback

#### Estimated lifetime of the initiative

11-15 years

#### Comment

Cemig's Energy Efficiency Program actions that resulted in Company scope 3 emission reduction were: 1. Boosting of APACs - Associations for the Protection and Assistance of Convicts (lighting); 2. Boosting of Schools (Lighting and Photovoltaic); 3. Boosting of low-income communities (lamp bulbs, refrigerators, Showers, Visits); 4. Boosting of Hospitals (Autoclaves, Lighting, Surgery Lights, Driers and Photovoltaic); 5. Boosting of Palácio da Liberdade; 6. Innovation of the solar heating system; 7. Boosting of Belo Horizonte Bus Central Station; 8. Financing of projects selected by Call for Proposals.

### C4.3c

**(C4.3c) What methods do you use to drive investment in emissions reduction activities?**

Method	Comment
Compliance with regulatory requirements/standards	Federal Law 9,991/2000: this Law lays down that 1% of the organization's net operating revenue must be directed to R&D financing and energy efficiency programs. Thus, Cemig created Energia Inteligente (EI), a program focused on energy efficiency, formed by several multi-annual and socio-environmental projects, which develops energy efficiency actions in low-income communities (in compliance with article 1, item V, of Law 9,991/2000, included by Law 12,212/2010) and in non-profit and philanthropic institutions.
Internal finance mechanisms	The replacement of the vehicle fleet uses resources from the Company's Investment Programs. Cemig's policy is to renew its vehicle fleet annually, so that the average age of vehicles does not exceed five years, the legal depreciation period set by the granting authority.
Dedicated budget for low-carbon product R&D	Cemig's Research and Development (R&D) Program aims to encourage a constant search for innovations and face the technological challenges of the electricity sector. In this context, Law 9,991/2000 lays down that electric energy distribution, generation, and transmission concessionaires and licensees should annually apply part of their net operating revenue to the Electricity Sector Research and Development Program regulated by Aneel. To ensure application of this resource, Cemig periodically publishes bid notices to bring in projects in several lines of action. The following are among the project lines related to climate change: Alternative sources, distributed and decentralized generation; Watershed management and energy planning; Measurement, billing and commercial losses; Environment.
Dedicated budget for other emissions reduction activities	Within the Distributor Development Program (PDD), there is a budget dedicated to the reduction of electrical losses by Cemig in the system and initiatives to reduce emissions by Cemig and the National Electric System.
Internal price on carbon	Cemig assesses the risk of increased carbon emissions in its energy matrix and the financial impact of this increase by carrying out environmental due diligence and sensitivity analyzes related to the acquisition of new projects, which is assisting the Company in decision-making on expanding its business.

Other (Distributed generation)	In 2012, Aneel Normative Resolution 482/2012 came into force, which lays down the general conditions for the access of micro and mini Distributed Generation (DG) to the electricity distribution systems via electric energy compensation modalities. As a result, the Brazilian consumer is now able to generate their own electricity from renewable sources and supply the surplus to the power grid. These innovations combine financial savings and socio-environmental awareness. In general, the presence of small generators can provide several benefits for the electrical system and utilities, among them: 1. The pushing back of investments in expansion of TeD systems 2. Low environmental impact; 3. Improvement of the mains voltage level during heavy load periods; 4. Increasing the energy efficiency of the source by reducing losses in electricity production and transmission; 5. Energy matrix diversification; and 6. Favoring the creation of new business models applicable to the electricity sector. Cemig, a pioneer in the process, and in line with the development of technology, connected Brazil's first microgeneration unit in September 2012. Since then, Cemig leads the market for GD connections in Brazil. From 2012 to 2019, 33,880 generating units were connected by the Company, being 33,745 (99.6%) photovoltaic solar sources, 97, thermal sources (biogas), 31, hydraulic sources, and 7, cogeneration ones (biomass), totaling an installed capacity of 407.4 MW with DG. Connections made by Cemig amount to 20.1% of all distributed DG in Brazil, and the 407.4 MW installed by Cemig represent 19.2% of the total 2,120.8 MW installed in the Brazilian territory. In 2019 alone, 22,403 new installations were carried out by the Company practically tripled the total number of utility connections in Cemig's concession area in just one year (a 294% increase in relation to total installations carried out until 2018). Also, in 2019 a project within the Movimenta Program (which fosters innovation from the Company's own employees) was developed. That software package increased productivity (decrease in process cycle time from 90 to 150 days to 20 days).
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## C4.5

**(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?**

Yes

## C4.5a

**(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.**

**Level of aggregation**

Group of products

**Description of product/Group of products**

Generation of renewable source energy: 99.7% of Cemig's nameplate capacity comes from renewable sources. By generating renewable energy, Cemig replaces energy generation from fossil fuels.

**Are these low-carbon product(s) or do they enable avoided emissions?**

Avoided emissions

**Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions**

Other, please specify (internal classification)

**% revenue from low carbon product(s) in the reporting year**

28.08

**% of total portfolio value**

<Not Applicable>

**Asset classes/ product types**

<Not Applicable>

**Comment**

Generation of renewable source energy: 1- This initiative allows the reduction of Scope 2 of consumers who purchase energy directly from Cemig via the Free Energy Market 2- By injecting renewable energy into the National Electric System, Cemig promotes a reduction in the emission factor of that system, benefiting all energy consumers connected to the grid. In 2019, 13,362 GWh of energy were generated from renewable sources (hydraulic + wind + solar). 3- It is estimated that generation of renewable energy in 2019 avoided emission of 1,002,180 tCO<sub>2</sub>. 4- It was assumed that renewable energy generation by Cemig avoided the generation from thermal sources in the National Interconnected System grid. To calculate emission reductions, the National Electric System (SIN) emission factor for the year 2019 (0.075 tCO<sub>2</sub>/MWh) was used, raised for GHG inventories by MCTIC (Ministry of Science, Technology, Innovations and Communications), times power generated from renewable sources (13,362 GWh).

**Level of aggregation**

Group of products

**Description of product/Group of products**

Distributed generation services CEMIG SIM was launched in 2019 to operate in the shared energy market through distributed generation based on a new model of partnerships, aiming at participating in new photovoltaic solar generation projects.

**Are these low-carbon product(s) or do they enable avoided emissions?**

Avoided emissions

**Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions**

Other, please specify (internal classification)

**% revenue from low carbon product(s) in the reporting year**

100

**% of total portfolio value**

<Not Applicable>

**Asset classes/ product types**

<Not Applicable>

**Comment**

Cemig Soluções Inteligentes em Energia - Cemig SIM 1- This initiative allows reduction of third party Scope 2, as it reduces the electricity consumption of the National Electric System of its customers. 2 - This type of generation allows consumers to produce their own energy and, when hiring Cemig SIM, they begin to obtain energy credits from the Company's solar farms. 3 - CEMIG SIM aims to expand its installed capacity to up to 142 MW by 2021. 4 - The projects implemented by CEMIG SIM in 2019 produced 7,527,000 kWh in distributed generation plants, which amounts to 557tCO<sub>2</sub>e, that stopped being emitted according to CEMIG SIM's internal methodology

**Level of aggregation**

Product

**Description of product/Group of products**

Natural gas: Gasmig, a Cemig subsidiary, is an exclusive piped natural gas distributor in territory of Minas Gerais.

**Are these low-carbon product(s) or do they enable avoided emissions?**

Low-carbon product

**Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions**

Other, please specify (Internal classification)

**% revenue from low carbon product(s) in the reporting year**

9.05

**% of total portfolio value**

<Not Applicable>

**Asset classes/ product types**

<Not Applicable>

**Comment**

Natural gas - Gasmig 1- This initiative allows the reduction of Scope 1 of third parties, since it allows its customers to consume fossil fuel with a lower GHG emission factor. 2- Gasmig invested R\$ 43 million in assets in 2019, mainly in the expansion of its Natural Gas Distribution Networks (RDGNs) in the State of Minas Gerais, by laying 37.67 km of gas pipelines in the Belo Horizonte Metropolitan Region (RMBH), in the South of Minas, and in Juiz de Fora, 3 - Gasmig monitors the amount of natural gas supplied to the sectors it serves (residential, commercial, industrial, and vehicular), the Company having sold 1.13 billion m3 in 2019. Due to an enhanced performance in the residential segment, its customer base increased by 22.85%, from 42,301 in 2018, to 51,966 consumer units in 2019. 4- In 2019, consumption of natural gas distributed by Gasmig avoided emission of 421,925 tCO2e. 5- The emission reduction estimate was made based on the assumption that, in the absence of natural gas distribution, the industry and thermal plants would consume fuel oil (which corresponded to 93% of the natural gas consumed in 2019), vehicles would consume gasoline (3.6%), commercial, residential use would use LPG (1.0%), and general use and cogeneration would use diesel oil (2.5%). Using the emission factors, the lower calorific powers, and densities of the GHG Protocol Brazil, emissions with natural gas (real scenario) and emissions of fuel oil, gasoline, LPG, and diesel oil (baseline scenario) were calculated. By subtracting actual scenario emissions from the baseline scenario, the avoided emissions were defined.

**C-EU4.6****(C-EU4.6) Describe your organization's efforts to reduce methane emissions from your activities.**

Cemig does not produce significant methane emissions in its electricity generation processes, since the emission of methane in hydroelectric plants is irrelevant, as has been pointed out in the specialized literature. Burning of fuel oil at Igarapé Thermoelectric Plant also does not emit methane in significant quantities. CEMIG's total CH4 emissions in 2019 were equivalent to 349.48 tCO2e, which amount to only 0.67% of total Scope 1 emissions.

However, Cemig manages the potential risk of leakage in its natural gas distribution operations and, therefore, the emission of methane, the main component of the gas. To identify possible natural gas leaks and reduce the volume of fugitive gas - considered a technical loss in the distribution operation - Gasmig monitors the network pressure remotely using data loggers. In addition, natural gas is artificially odorized to facilitate the identification of leaks by the local population and the Fire Department. Gasmig has a 24-hour call center so that leak detection can be reported.

Gasmig has a cathodic protection system associated with the external polyethylene coating structure, which offers mechanical and anticorrosive protection for the piping. By preserving the integrity of its gas pipelines, the Company is making efforts to reduce methane emissions from its activities.

**C5. Emissions methodology****C5.1****(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).****Scope 1****Base year start**

January 1 2017

**Base year end**

December 31 2017

**Base year emissions (metric tons CO2e)**

48849

**Comment**

The historical base year chosen is referenced due to the year set as the total energy loss reduction goal (scope 2) by the Company in 2018.

**Scope 2 (location-based)****Base year start**

January 1 2017

**Base year end**

December 31 2017

**Base year emissions (metric tons CO2e)**

664413

**Comment**

For Scope 2, the year 2017 was used, as it is defined by the regulatory agent (Aneel) for a new total power loss reduction indicator cycle.

## Scope 2 (market-based)

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

0

**Comment**

Not applicable to Cemig.

## C5.2

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**(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.**

Brazil GHG Protocol Programme

IPCC Guidelines for National Greenhouse Gas Inventories, 2006

ISO 14064-1

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

## C6. Emissions data

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### C6.1

**(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?**

**Reporting year**

**Gross global Scope 1 emissions (metric tons CO2e)**

51938.62

**Start date**

<Not Applicable>

**End date**

<Not Applicable>

**Comment**

Thermal Power Plant (TPP) Igarapé (installed capacity, 131 MW) operates to meet the contingencies of the Brazilian Interconnected Electric System (SIN) and, in 2019, was responsible for 72% of Cemig's Scope 1 emissions. It is important to mention that the decision of energy movement in Brazil (composition of hydrothermal generation every week) is made by the National Electricity System Operator (ONS), based on the prospective analysis of forecast of future inflow scenarios, consumption growth expectation, and definition of the expansion schedule for new plants. In periods of favorable hydrology and high water storage levels in the system reservoirs, the generation decision in thermoelectric plants is minimized, prioritizing hydroelectric generation. As for 2018, there was a 75% increase in emissions (35,568 tCO2e). This happened in order to consume all the fuel oil in stock at TPP Igarapé, as it closed its operations in 2019.

### C6.2

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**(C6.2) Describe your organization's approach to reporting Scope 2 emissions.**

**Row 1**

**Scope 2, location-based**

We are reporting a Scope 2, location-based figure

**Scope 2, market-based**

We have no operations where we are able to access electricity supplier emission factors or residual emissions factors and are unable to report a Scope 2, market-based figure

**Comment**

For companies in the electric industry that have generation and distribution businesses, like Cemig, it is not possible to buy energy from other suppliers; so, it is not possible to book emissions based on the market.

### C6.3

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**(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?**

**Reporting year**

**Scope 2, location-based**

598518.28

**Scope 2, market-based (if applicable)**

<Not Applicable>

**Start date**

<Not Applicable>

**End date**

<Not Applicable>

**Comment**

For companies in the electric industry that have generation and distribution businesses, like Cemig, it is not possible to buy energy from other suppliers; so, it is not possible to book emissions based on the market.

## C6.4

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**(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?**

Yes

### C6.4a

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**(C6.4a) Provide details of the sources of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure.**

**Source**

Emissions from the use of CO2 in fire extinguishers

**Relevance of Scope 1 emissions from this source**

Emissions are not relevant

**Relevance of location-based Scope 2 emissions from this source**

No emissions from this source

**Relevance of market-based Scope 2 emissions from this source (if applicable)**

No emissions excluded

**Explain why this source is excluded**

Fugitive CO2 emissions from the use of fire extinguishers are in the process of improving their accounting by CEMIG D and CEMIG GT units. The other units still have no control over this data. However, this data is not material for Cemig, since the share of these emissions is very small compared to the company's other sources of emissions (it accounts for less than 0.01% of Scope 1).

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## C6.5

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**(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.**

**Purchased goods and services**

**Evaluation status**

Relevant, calculated

**Metric tonnes CO2e**

63.29

**Emissions calculation methodology**

CEMIG's GHG emissions inventory was prepared using CLIMAS, a calculation software developed by specialized consulting company WayCarbon, which has a database with the most current emission factors available for each type of source (for example, Brazilian Program GHG Protocol for Brazil and, when not available, internationally accepted references such as GHG Protocol, IPCC, EPA and DEFRA). In general, GHG emissions and removals are calculated for each source individually using the following formula:  $Emission = Activity\_Data * Emission\_Factor * Global\_Heating\_Potential$  Emission factors are based mainly on the following references: IPCC (2006), Brazilian GHG Protocol Program (2020), National Energy Balance (2019) and Ministry of Science, Technology, Innovations and Communications (2020).

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

**Please explain**

N/A

**Capital goods**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

In 2017, in order to restore the Company's financial balance, Cemig initiated a divestment program. The objective of the program is to set an asset sale process following these criteria for prioritizing the assets to be divested: a) Assets w/ greater liquidity; b) Assets without short-term returns; and c) Non-strategic assets and/or assets with minor interests. In this divestment context, emissions linked to the acquisition of capital goods were not relevant for Cemig in 2019.

**Fuel-and-energy-related activities (not included in Scope 1 or 2)**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

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**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

Emissions due to losses in the transmission and distribution systems for electricity produced by Cemig were accounted for in Scope 2. Namely, in 2019 there was no shipment of fossil fuel (oil) from the refineries to Igarapé thermal plant. That shipment was previously carried out by tank trucks and its emission was accounted for in "Upstream transport and distribution" line.

**Upstream transportation and distribution**

**Evaluation status**

Relevant, calculated

**Metric tonnes CO2e**

790.63

**Emissions calculation methodology**

CEMIG's GHG emissions inventory was prepared using CLIMAS, a calculation software developed by specialized WayCarbon, which has a database with the most current emission factors available for each type of source (for example, Brazilian Program GHG Protocol for Brazil and, when not available, internationally accepted references such as GHG Protocol, IPCC, EPA and DEFRA). In general, GHG emissions and removals are calculated for each source individually using the following formula: Emission = Activity\_Data \* Emission\_Factor \* Global\_Heating\_Potential Emission factors are based mainly on the following references: IPCC (2006), Brazilian GHG Protocol Program (2020), National Energy Balance (2019) and Ministry of Science, Technology, Innovations and Communications (2020).

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

**Please explain**

N/A

**Waste generated in operations**

**Evaluation status**

Relevant, calculated

**Metric tonnes CO2e**

615.7

**Emissions calculation methodology**

CEMIG's GHG emissions inventory was prepared using CLIMAS, a calculation software developed by specialized WayCarbon, which has a database with the most current emission factors available for each type of source (for example, Brazilian Program GHG Protocol for Brazil and, when not available, internationally accepted references such as GHG Protocol, IPCC, EPA and DEFRA). In general, GHG emissions and removals are calculated for each source individually using the following formula: Emission = Activity\_Data \* Emission\_Factor \* Global\_Heating\_Potential Emission factors are based mainly on the following references: IPCC (2006), Brazilian GHG Protocol Program (2020), National Energy Balance (2019) and Ministry of Science, Technology, Innovations and Communications (2020).

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

**Please explain**

N/A

**Business travel**

**Evaluation status**

Relevant, calculated

**Metric tonnes CO2e**

428.07

**Emissions calculation methodology**

CEMIG's GHG emissions inventory was prepared using CLIMAS, a calculation software developed by specialized WayCarbon, which has a database with the most current emission factors available for each type of source (for example, Brazilian Program GHG Protocol for Brazil and, when not available, internationally accepted references such as GHG Protocol, IPCC, EPA and DEFRA). In general, GHG emissions and removals are calculated for each source individually using the following formula: Emission = Activity\_Data \* Emission\_Factor \* Global\_Heating\_Potential Emission factors are based mainly on the following references: IPCC (2006), Brazilian GHG Protocol Program (2020), National Energy Balance (2019) and Ministry of Science, Technology, Innovations and Communications (2020).

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

**Please explain**

N/A

**Employee commuting**

**Evaluation status**

Relevant, calculated

**Metric tonnes CO2e**

215.47

**Emissions calculation methodology**

CEMIG's GHG emissions inventory was prepared using CLIMAS, a calculation software developed by specialized WayCarbon, which has a database with the most current emission factors available for each type of source (for example, Brazilian Program GHG Protocol for Brazil and, when not available, internationally accepted references such as GHG Protocol, IPCC, EPA and DEFRA). In general, GHG emissions and removals are calculated for each source individually using the following formula: Emission = Activity\_Data \* Emission\_Factor \* Global\_Heating\_Potential Emission factors are based mainly on the following references: IPCC (2006), Brazilian GHG Protocol Program (2020), National Energy Balance (2019) and Ministry of Science, Technology, Innovations and Communications (2020).

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0



**Please explain**

N/A

**Upstream leased assets**

**Evaluation status**

Not evaluated

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

Cemig does not have leased assets upstream. Thus, this source is not relevant for Cemig.

**Downstream transportation and distribution**

**Evaluation status**

Not relevant, calculated

**Metric tonnes CO2e**

22699.24

**Emissions calculation methodology**

CEMIG's GHG emissions inventory was prepared using CLIMAS, a calculation software developed by specialized WayCarbon, which has a database with the most current emission factors available for each type of source (for example, Brazilian Program GHG Protocol for Brazil and, when not available, internationally accepted references such as GHG Protocol, IPCC, EPA and DEFRA). In general, GHG emissions and removals are calculated for each source individually using to the following formula:  $Emission = Activity\_Data * Emission\_Factor * Global\_Heating\_Potential$  Emission factors are based mainly on the following references: IPCC (2006), Brazilian GHG Protocol Program (2020), National Energy Balance (2019) and Ministry of Science, Technology, Innovations and Communications (2020).

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

100

**Please explain**

N/A

**Processing of sold products**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

The product sold by Cemig (electricity) is not processed as an intermediate product for producing final consumption assets; electricity is an input in production processes, not an intermediate good. Thus, this emission source does not apply to Cemig.

**Use of sold products**

**Evaluation status**

Relevant, calculated

**Metric tonnes CO2e**

6426649.39

**Emissions calculation methodology**

CEMIG's GHG emissions inventory was prepared using CLIMAS, a calculation software developed by specialized WayCarbon, which has a database with the most current emission factors available for each type of source (for example, Brazilian Program GHG Protocol for Brazil and, when not available, internationally accepted references such as GHG Protocol, IPCC, EPA and DEFRA). In general, GHG emissions and removals are calculated for each source individually using to the following formula:  $Emission = Activity\_Data * Emission\_Factor * Global\_Heating\_Potential$  Emission factors are based mainly on the following references: IPCC (2006), Brazilian GHG Protocol Program (2020), National Energy Balance (2019) and Ministry of Science, Technology, Innovations and Communications (2020).

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

**Please explain**

N/A

**End of life treatment of sold products**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

The product sold by Cemig (electricity) has no end-of-life treatment, as it does not produce waste to be treated or disposed of. So, this source does not apply to Cemig.

**Downstream leased assets**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

Cemig does not lease goods. So, this emission source does not apply to Company.

**Franchises**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

Cemig has no franchises. So, this emission source does not apply to Company.

**Investments**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

Investments made by Cemig do not imply in emission increase. So, this emission source does not apply to Company.

**Other (upstream)**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

No other relevant source was found upstream.

**Other (downstream)**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes CO2e**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

No other relevant source was found downstream.

## C6.7

### (C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?

Yes

## C6.7a

### (C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	1677	Direct CO2 emissions (Scope 1) from the use of renewable biomass energy. In preparing the Company's GHG inventory, the definition of renewable biomass adopted by the Executive Committee of the Clean Development Mechanism of the United Nations Framework Convention on Climate Change (EB 23, Annex 18) was adopted. Emissions of this kind do not contribute to long-term increase in the concentration of CO2 in the atmosphere.

## C6.10

### (C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

#### Intensity figure

0.000025618

#### Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

650456.9

#### Metric denominator

unit total revenue

#### Metric denominator: Unit total

25390306000

#### Scope 2 figure used

Location-based

#### % change from previous year

3.01

#### Direction of change

Increased

#### Reason for change

Cemig's scope 1 and 2 emissions increased, respectively, 46.0% and 15.5% against 2018. Scope emission increase is mainly associated to stationary combustion emissions, at 37,582 tCO2e, with consumption of fuel oil at Thermal Power Plant (TPP) Igarapé alone being responsible for 99% of that total. In relation to 2018, this category showed a 75% increase in emissions. This happened in order to consume all the fuel oil in stock at the Plant, as it closed its operations in 2019. In terms of Transmission and Distribution Losses (which amount to 99.47% of the Scope 2 emissions) was an increase of about 15.56% in 2019 in relation to the previous year, mainly due to refining data with greater monthly precision. There was also a 1.35% increase in the grid average emission factor against the previous year. Also, Cemig's net operating revenues increased 14.03% in that period. Despite this increase in the denominator value, the indicator also grew. The result as an intensity increase.

#### Intensity figure

0.048514605

#### Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

650456.9

#### Metric denominator

megawatt hour generated (MWh)

#### Metric denominator: Unit total

13407445

#### Scope 2 figure used

Location-based

#### % change from previous year

33.21

#### Direction of change

Increased

#### Reason for change

Cemig's scope 1 and 2 emissions increased, respectively, 46.0% and 15.5% against 2018. Scope emission increase is mainly associated to stationary combustion emissions, at 37,582 tCO2e, with consumption of fuel oil at TPP Igarapé alone being responsible for 99% of that total. In relation to 2018, this category showed a 75% increase in emissions. This happened in order to consume all the fuel oil in stock at the Plant, as it closed its operations in 2019. In terms of Transmission and Distribution Losses (which amount to 99.47% of the Scope 2 emissions) was an increase of about 15.56% in 2019 in relation to the previous year, mainly due to refining data with greater monthly precision. There was also a 1.35% increase in the grid average emission factor against the previous year. Cemig's net generation dropped 2.28% in 2019.

## C7. Emissions breakdowns

### C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

Yes

### C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	46340.25	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	349.48	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	290.34	IPCC Fourth Assessment Report (AR4 - 100 year)
SF6	4958.54	IPCC Fourth Assessment Report (AR4 - 100 year)

### C-EU7.1b

(C-EU7.1b) Break down your total gross global Scope 1 emissions from electric utilities value chain activities by greenhouse gas type.

	Gross Scope 1 CO2 emissions (metric tons CO2)	Gross Scope 1 methane emissions (metric tons CH4)	Gross Scope 1 SF6 emissions (metric tons SF6)	Total gross Scope 1 emissions (metric tons CO2e)	Comment
Fugitives	0.02	11.23	0.22	5239.42	Fugitive category emissions derived mainly from SF6 escape in transmission and distribution systems, that precursor accounting for 95% of total emissions in that category.
Combustion (Electric utilities)	46243.2	2.61	0	46557.06	Cemig's stationary and mobile combustion emissions, except for Gasmig and CEMIG SIM
Combustion (Gas utilities)	85.88	0.13	0	90.71	Gasmig's mobile combustion emissions
Combustion (Other)	2.15	0.04	0	2.27	CEMIG SIM's mobile combustion emissions
Emissions not elsewhere classified	9	0	0	49.16	Farming and Change in Land Use category emissions.

### C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
Brazil	51938.62

### C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division

By activity

### C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Cemig GT	39928.55
Cemig D	11457.46
GASMIG	371.58
CEMIG SIM	2.27
Camargos	11.81
CEMIG PCH	0.48
Horizontes	0.05
Itutinga	11.61
Leste	11.87
Oeste	9.9
Parajuru - Eólica	26.11
Rosal	23.35
Sá Carvalho	2.56
Salto Grande	14.12
Sul	17.72
Três Marias	8.58
Volta do Rio - Eólica	40.6

C7.3c

(C7.3c) Break down your total gross global Scope 1 emissions by business activity.

Activity	Scope 1 emissions (metric tons CO2e)
Stationary combustion	37582.05
Mobile combustion	9068
Fugitive emissions	5239.42
Agricultural and land use change	49.16

C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4

(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

	Gross Scope 1 emissions, metric tons CO2e	Net Scope 1 emissions , metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Electric utility activities	51938.62	<Not Applicable>	N/A
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (midstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (downstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Increased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	0	No change	0	99% of energy produced by CEMIG in 2019 came from renewable sources and exported into the grid. Energy consumed by CEMIG is considered as coming from the grid; thus, it cannot be accounted as renewable energy purchase.
Other emissions reduction activities	17.45	Decreased	26	CEMIG has projects in the Energy Efficiency Program, that consist in reductions in the consumption of electrical energy by end consumers thanks to the replacement of obsolete electrical equipment with a high level of consumption and environmental education initiatives. This way, the Program stands as a relevant instrument for reducing GHG emissions in Cemig's value chain. In 2019, these projects avoided emission of over 11 K tCO2e. However, these values are not accounted in CEMIG's GHG inventory. Between 2018 and 2019 Cemig managed to reduce its Land Use Change emissions (Scope 1). In 2018, this category emitted 66.61 tCO2e. In 2019, the emission was 49.16 tCO2e. Thus, 66.61 tCO2e - 49.16 tCO2e = 17.45 tCO2e, which corresponds to a 26% reduction in the category, as 26% = (66.61 - 49.16) / 66.61) * 100.
Divestment	0	No change	0	No divestitures between 2018 and 2019.
Acquisitions	0	No change	0	No acquisitions between 2018 and 2019.
Mergers	0	No change	0	No mergers between 2018 and 2019.
Change in output	0	No change		There was no change in corporate earnings impacting emissions between 2018 and 2019.
Change in methodology	0	No change	0	No change in methodology between 2018 and 2019.
Change in boundary	0	No change	0	No change in limit between 2018 and 2019.
Change in physical operating conditions	0	No change	0	There was no change in physical conditions impacting operation from 2018 to 2019.
Unidentified	0	No change	0	N/A
Other	96675.7	Increased	17.46	Cemig's scope 1 and 2 emissions increased, respectively, 46.0% and 15.5% against 2018. Scope emission increase is mainly associated to stationary combustion emissions, at 37,582 tCO2e, with consumption of fuel oil at Thermal Power Plant (TPP) Igarapé alone being responsible for 99% of that total. In relation to 2018, this category showed a 75% increase in emissions. This happened in order to consume all the fuel oil in stock at the Plant, as it closed its operations in 2019. In terms of Transmission and Distribution Losses (which amount to 99.47% of the Scope 2 emissions) was an increase of about 15.56% in 2019 in relation to the previous year, mainly due to refining data with greater monthly precision. There was also a 1.35% increase in the grid average emission factor against the previous year. Finally, the combined increase of scope 1 and 2 emissions was 17.46%.

## C7.9b

**(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?**

Location-based

## C8. Energy

### C8.1

**(C8.1) What percentage of your total operational spend in the reporting year was on energy?**

More than 50% but less than or equal to 55%

### C8.2

**(C8.2) Select which energy-related activities your organization has undertaken.**

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	No
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	Yes

### C8.2a

**(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.**

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	2371.76	172469.92	174841.68
Consumption of purchased or acquired electricity	<Not Applicable>	0	216721.26	216721.26
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	0	<Not Applicable>	0
Total energy consumption	<Not Applicable>	2371.76	389191.18	391562.94

### C8.2b

**(C8.2b) Select the applications of your organization's consumption of fuel.**

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	No
Consumption of fuel for the generation of steam	No
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	No

### C8.2c

**(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.**

#### Fuels (excluding feedstocks)

Diesel

#### Heating value

LHV (lower heating value)

**Total fuel MWh consumed by the organization**

31126.6

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-cogeneration or self-trigeneration**

&lt;Not Applicable&gt;

**Emission factor**

2.64659

**Unit**

metric tons CO2e per m3

**Emissions factor source**

GHG Protocol Brazilian Program

**Comment**

This average emission factor considers factors for mobile and stationary combustion categories

**Fuels (excluding feedstocks)**

Petrol

**Heating value**

LHV (lower heating value)

**Total fuel MWh consumed by the organization**

6215.94

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-cogeneration or self-trigeneration**

&lt;Not Applicable&gt;

**Emission factor**

1.73768

**Unit**

metric tons CO2e per m3

**Emissions factor source**

GHG Protocol Brazilian Program

**Comment**

This emission factor was used to calculate mobile combustion emissions.

**Fuels (excluding feedstocks)**

Liquefied Petroleum Gas (LPG)

**Heating value**

LHV (lower heating value)

**Total fuel MWh consumed by the organization**

3.42

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-cogeneration or self-trigeneration**

&lt;Not Applicable&gt;

**Emission factor**

3.06076

**Unit**

metric tons CO2e per metric ton

**Emissions factor source**

2006 IPCC Guidelines for National Greenhouse Gas Inventories

**Comment**

This emission factor was used to calculate mobile combustion emissions

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**Fuels (excluding feedstocks)**

Natural Gas

**Heating value**

LHV (lower heating value)

**Total fuel MWh consumed by the organization**

61.71

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self-cogeneration or self-trigeneration**

<Not Applicable>

**Emission factor**

0.00199

**Unit**

metric tons CO2e per m3

**Emissions factor source**

2006 IPCC Guidelines for National Greenhouse Gas Inventories

**Comment**

This emission factor was used to calculate stationary combustion emissions.

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**Fuels (excluding feedstocks)**

Other, please specify (Gás natural veicular)

**Heating value**

LHV (lower heating value)

**Total fuel MWh consumed by the organization**

378.04

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self-cogeneration or self-trigeneration**

<Not Applicable>

**Emission factor**

0.00207

**Unit**

metric tons CO2e per m3

**Emissions factor source**

2006 IPCC Guidelines for National Greenhouse Gas Inventories

**Comment**

This emission factor was used to calculate mobile combustion emissions

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**Fuels (excluding feedstocks)**

Jet Kerosene

**Heating value**

LHV (lower heating value)

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**Total fuel MWh consumed by the organization**

1576.2

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-cogeneration or self-trigeneration**

&lt;Not Applicable&gt;

**Emission factor**

2.54081

**Unit**

metric tons CO2e per m3

**Emissions factor source**

2006 IPCC Guidelines for National Greenhouse Gas Inventories

**Comment**

This emission factor was used to calculate mobile combustion emissions

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**Fuels (excluding feedstocks)**

Other, please specify (Fuel oil)

**Heating value**

LHV (lower heating value)

**Total fuel MWh consumed by the organization**

133108.01

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-cogeneration or self-trigeneration**

&lt;Not Applicable&gt;

**Emission factor**

3.13721

**Unit**

metric tons CO2e per metric ton

**Emissions factor source**

2006 IPCC Guidelines for National Greenhouse Gas Inventories

**Comment**

This emission factor was used to calculate stationary combustion emissions

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**Fuels (excluding feedstocks)**

Other, please specify (Hydrous ethanol)

**Heating value**

LHV (lower heating value)

**Total fuel MWh consumed by the organization**

2371.76

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self-cogeneration or self-trigeneration**

&lt;Not Applicable&gt;

**Emission factor**

434.1867

**Unit**

metric tons CO2e per m3

**Emissions factor source**

GHG Protocol Brazilian Program

**Comment**

This emission factor was used to calculate mobile combustion emissions

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C-EU8.2d

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(C-EU8.2d) For your electric utility activities, provide a breakdown of your total power plant capacity, generation, and related emissions during the reporting year by source.

**Coal – hard**

**Nameplate capacity (MW)**

0

**Gross electricity generation (GWh)**

0

**Net electricity generation (GWh)**

0

**Absolute scope 1 emissions (metric tons CO2e)**

0

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

0

**Comment**

N/A

**Lignite**

**Nameplate capacity (MW)**

0

**Gross electricity generation (GWh)**

0

**Net electricity generation (GWh)**

0

**Absolute scope 1 emissions (metric tons CO2e)**

0

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

0

**Comment**

N/A

**Oil**

**Nameplate capacity (MW)**

0

**Gross electricity generation (GWh)**

0

**Net electricity generation (GWh)**

0

**Absolute scope 1 emissions (metric tons CO2e)**

0

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

0

**Comment**

N/A

**Gas**

**Nameplate capacity (MW)**

0

**Gross electricity generation (GWh)**

0

**Net electricity generation (GWh)**

0

**Absolute scope 1 emissions (metric tons CO2e)**

0

---

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

N/A

**Biomass**

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

N/A

**Waste (non-biomass)**

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

N/A

**Nuclear**

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

N/A

**Fossil-fuel plants fitted with CCS**

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

N/A

**Geothermal**

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

**Net electricity generation (GWh)**

0

**Absolute scope 1 emissions (metric tons CO2e)**

0

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

0

**Comment**

N/A

**Hydropower****Nameplate capacity (MW)**

5903

**Gross electricity generation (GWh)**

15345.59

**Net electricity generation (GWh)**

13208.16

**Absolute scope 1 emissions (metric tons CO2e)**

2505.11

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

0.19

**Comment**

Emission intensity was calculated by diving Cemig GT scope 1 emissions from hydropower plants alone (that is, excluding emissions from Thermal Power Plant (TPP) Igarapé and Parajuru and Volta do Rio windfarms) by the net hydropower plant energy generation.

**Wind****Nameplate capacity (MW)**

115

**Gross electricity generation (GWh)**

327.5

**Net electricity generation (GWh)**

151.82

**Absolute scope 1 emissions (metric tons CO2e)**

66.71

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

0.44

**Comment**

Emission intensity was calculated by diving Cemig GT scope 1 emissions only by Parajuru and Volta do Rio windfarm (that is, TPP Igarapé and hydropower emissions were excluded) by the net hydropower plant energy generation.

**Solar****Nameplate capacity (MW)**

1

**Gross electricity generation (GWh)**

1.42

**Net electricity generation (GWh)**

0.14

**Absolute scope 1 emissions (metric tons CO2e)**

0

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

0

**Comment**

Emissions that may be related to operation of Cemig solar plants were accounted under hydropower sources.

**Marine****Nameplate capacity (MW)**

0

**Gross electricity generation (GWh)**

0

**Net electricity generation (GWh)**

0

**Absolute scope 1 emissions (metric tons CO2e)**

0

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

0

**Comment**

N/A

**Other renewable**

**Nameplate capacity (MW)**

0

**Gross electricity generation (GWh)**

0

**Net electricity generation (GWh)**

0

**Absolute scope 1 emissions (metric tons CO2e)**

0

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

0

**Comment**

N/A

**Other non-renewable**

**Nameplate capacity (MW)**

131

**Gross electricity generation (GWh)**

45.09

**Net electricity generation (GWh)**

45.09

**Absolute scope 1 emissions (metric tons CO2e)**

37535.49

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

832.48

**Comment**

Emission intensity was calculated by dividing Thermal Power Plant (TPP) Igarapé Scope 1 emissions by TPP Igarapé net energy generation. Notice that, by late 2019, TPP Igarapé was shut down, so, despite having generated energy along the year, it is no longer counted as nameplate capacity for CEMIG.

**Total**

**Nameplate capacity (MW)**

6020

**Gross electricity generation (GWh)**

15719.6

**Net electricity generation (GWh)**

13407.45

**Absolute scope 1 emissions (metric tons CO2e)**

40107.3

**Scope 1 emissions intensity (metric tons CO2e per GWh)**

2.99

**Comment**

Emission intensity was calculated dividing CEMIG GT Scope 1 emissions (that is, not including CEMIG D, CEMIG SIM and GASMIG Scope 1 emissions) by total net energy generation.

**C-EU8.4**

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**(C-EU8.4) Does your electric utility organization have a transmission and distribution business?**

Yes

**C-EU8.4a**

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**(C-EU8.4a) Disclose the following information about your transmission and distribution business.**

**Country/Region**

Brazil

**Voltage level**

Transmission (high voltage)

**Annual load (GWh)**

0

**Annual energy losses (% of annual load)**

0

**Scope where emissions from energy losses are accounted for**

Scope 2 (location-based)

**Emissions from energy losses (metric tons CO2e)**

10324.55

**Length of network (km)**

4930

**Number of connections**

38

**Area covered (km2)**

567478

**Comment**

The number of connections was reported as the number of Transmission grid substations. Scope 2 emissions presented considered the "Transmission Losses" category for Cemig GT.

**Country/Region**

Brazil

**Voltage level**

Distribution (low voltage)

**Annual load (GWh)**

44950.96

**Annual energy losses (% of annual load)**

13.57

**Scope where emissions from energy losses are accounted for**

Scope 2 (location-based)

**Emissions from energy losses (metric tons CO2e)**

585040.05

**Length of network (km)**

539807

**Number of connections**

8537040

**Area covered (km2)**

567478

**Comment**

Annual load is the energy balance injected in the grid by Cemig D. Losses were calculated by the difference between injected energy and total market requirement (captive + free). Scope 2 emissions presented considered the "Distribution Losses" category for Cemig D. Connection number is given by the number of consumers serviced by Cemig D.

## C9. Additional metrics

## C9.1

**(C9.1) Provide any additional climate-related metrics relevant to your business.****Description**

Other, please specify (Scope 1 emission intensity per produced MWh (CO2e/MWh))

*Metric value: 0.00247564*

**Metric value**

3873.86

**Metric numerator**

Direct emissions (Scope 1)

**Metric denominator (intensity metric only)**

Net energy generation measured in MWh

**% change from previous year**

60

**Direction of change**

Increased

**Please explain**

Direct emission intensity is calculated by dividing Scope 1 emissions by Cemig net energy generation. This intensity is directly influenced by consumption of fuel oil for Thermal Power Plant (TPP) Igarapé production (greater responsible for scope 1 emissions in the Company) and Cemig's net energy generation. In 2019, Cemig's net energy production decreased 2% against 2018 (from 13,720,045 MWh to 13,407,445 MWh). Also, TPP Igarapé emissions increased 75% from 2018 to 2019, resulting in the increase in emission intensity (0.00387 tCO2e/MWh or 3,873.86 CO2e/MWh).

C-EU9.5a

(C-EU9.5a) Break down, by source, your total planned CAPEX in your current CAPEX plan for power generation.

Primary power generation source	CAPEX planned for power generation from this source	Percentage of total CAPEX planned for power generation	End year of CAPEX plan	Comment
Hydropower	250000000	64	2024	The current Capex plan (2020-2024) provides for R\$390 million in investments in Generation. Considering the same proportion at the Hydropower source in relation to 2019, the amount for 2020 is expected at R\$ 250 million.
Biomass	780000000	20	2024	The current Capex plan (2020-2024) provides for R\$390 million in investments in Generation. Considering the same proportion at the Biomass source in relation to 2019, the amount for 2020 is expected at R\$ 78 million.
Solar	590000000	15	2024	The current Capex plan (2020-2024) provides for R\$390 million in investments in Generation. Considering the same proportion at the Solar generation in relation to 2019, the amount for 2020 is expected at R\$ 59 million.

C-EU9.5b

(C-EU9.5b) Break down your total planned CAPEX in your current CAPEX plan for products and services (e.g. smart grids, digitalization, etc.).

Products and services	Description of product/service	CAPEX planned for product/service	Percentage of total CAPEX planned products and services	End of year CAPEX plan
Other, please specify (Capex planned for development renewable electric energy)	The current Capex plan (2020-2024) provides for substantial investments in the Generation business, where 100% of electricity is produced by renewable sources. In 2019, R\$ 26 million was invested, and in 2020, expectations are for R\$ 95. Source: 2019 CEMIG Result Presentation, available at: <a href="https://mz-filemanager.s3.amazonaws.com/716a131f-9624-452c-9088-0cd6983c1349/central-de-resultadoscentral-de-downloads/2edfe821fd8b30899ec5a17a7856d2372566a0dd6594d1c8fb79625a4aa32ddd/apresentacao_dos_resultados_4t119.pdf">https://mz-filemanager.s3.amazonaws.com/716a131f-9624-452c-9088-0cd6983c1349/central-de-resultadoscentral-de-downloads/2edfe821fd8b30899ec5a17a7856d2372566a0dd6594d1c8fb79625a4aa32ddd/apresentacao_dos_resultados_4t119.pdf</a>	390000000	4	2024
Other, please specify (Capex planned for improving distribution services)	The current Capex plan (2020-2024) provides for substantial investments in the Distribution business. In 2019, R\$ 986 million was invested, and in 2020, expectations are for R\$ 1,667. Source: 2019 CEMIG Result Presentation, available at: <a href="https://mz-filemanager.s3.amazonaws.com/716a131f-9624-452c-9088-0cd6983c1349/central-de-resultadoscentral-de-downloads/2edfe821fd8b30899ec5a17a7856d2372566a0dd6594d1c8fb79625a4aa32ddd/apresentacao_dos_resultados_4t119.pdf">https://mz-filemanager.s3.amazonaws.com/716a131f-9624-452c-9088-0cd6983c1349/central-de-resultadoscentral-de-downloads/2edfe821fd8b30899ec5a17a7856d2372566a0dd6594d1c8fb79625a4aa32ddd/apresentacao_dos_resultados_4t119.pdf</a>	8653000000	83	2024
Other, please specify (Transmission )	The current Capex plan (2020-2024) provides for substantial investments in the Transmission business. In 2019, R\$ 223 million was invested, and in 2020, expectations are for R\$ 250. Source: 2019 CEMIG Result Presentation, available at: <a href="https://mz-filemanager.s3.amazonaws.com/716a131f-9624-452c-9088-0cd6983c1349/central-de-resultadoscentral-de-downloads/2edfe821fd8b30899ec5a17a7856d2372566a0dd6594d1c8fb79625a4aa32ddd/apresentacao_dos_resultados_4t119.pdf">https://mz-filemanager.s3.amazonaws.com/716a131f-9624-452c-9088-0cd6983c1349/central-de-resultadoscentral-de-downloads/2edfe821fd8b30899ec5a17a7856d2372566a0dd6594d1c8fb79625a4aa32ddd/apresentacao_dos_resultados_4t119.pdf</a>	1139000000	13	2024
Other, please specify (Transmission and distribution)	Cemig D expects investments according to the Distribution Development Plan – PDD in the 2018 - 2022 period, amounting to R\$ 6 billion. That amount is intended for works in high, medium and low voltage in the power system for expansion and boosting, operation and maintenance, refurbishing, customer meter replacement, environment, third-party safety, and telecommunications. In 2019, the Company made investments amounting to about R\$ 971.3 million, totaling 1.8 billion invested so far.	6000000000	31	2022

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	The development of innovations in products and processes is a fundamental part of Cemig's activities. Cemig annually invests part of its net operating revenue in Research and Development in the electric energy sector. As they are elements that make up the electricity generation process, the topics of alternative sources, generation technologies, distributed generation, smart grids, electric vehicles, energy efficiency, and the best use of traditional energy resources also make up what Cemig considers as energy alternatives. The company has a Technology Research & Development (R&D) program in place since the 1990s. A bid notice for investment in R&D was released in 2018, called Cemig 4.0. That tender notice included 8 demands, one of which had no project selected. Of the 7 approved projects, 6 were contracted. In 2019, 2 new calls for tenders were started to receive proposals geared at suggesting innovative solutions for electric mobility and a device for individual notification in case of dams emergencies.

C-CO9.6a/C-EU9.6a/C-OG9.6a

(C-CO9.6a/C-EU9.6a/C-OG9.6a) Provide details of your organization's investments in low-carbon R&D for your sector activities over the last three years.

Technology area	Stage of development in the reporting year	Average % of total R&D investment over the last 3 years	R&D investment figure in the reporting year (optional)	Comment
Distributed energy resources	Applied research and development	21-40%	3756908.65	In 2019, CEMIG made a R\$ 17,483,948.55 investment. The R\$ 3,756,908.65 amount relates to the Distributed Energy Resource Management System project. That project consists in a methodology for systematic integration of Distributed Energy Resources (RED) scattered along Cemig's power network to the Distribution Operation Center (COD), taking into account the relevant technical and operational aspects.

## C10. Verification

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### C10.1

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**(C10.1) Indicate the verification/assurance status that applies to your reported emissions.**

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

### C10.1a

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**(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.**

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/ section reference**

Page 64

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

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### C10.1b

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**(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.**

**Scope 2 approach**

Scope 2 location-based

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/ section reference**

Page 64

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

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### C10.1c

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**(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.**

**Scope 3 category**

Scope 3: Purchased goods and services

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

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**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/section reference**

Page 63

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

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**Scope 3 category**

Scope 3: Upstream transportation and distribution

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/section reference**

Page 63

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

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**Scope 3 category**

Scope 3: Waste generated in operations

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/section reference**

Page 63

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

---

**Scope 3 category**

Scope 3: Business travel

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/section reference**

Page 63

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

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**Scope 3 category**

Scope 3: Employee commuting

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/section reference**

Page 63

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

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**Scope 3 category**

Scope 3: Downstream transportation and distribution

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/section reference**

Page 63

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

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**Scope 3 category**

Scope 3: Use of sold products

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/section reference**

Page 63

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

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## C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

Yes

**(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?**

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C0. Introduction	Other, please specify (General description of the company, reporting year, reporting consolidation method, organizational activities.)	Annual independent verification of the Cemig's Sustainability Report is based on the best practices laid down in the GRI Standards Principles for Sustainability Reports and the ISAE3000 assurance standard.	Annually, Cemig submits its Sustainability Report to independent verification, to ensure the legitimacy of its content. The audit process comprised (i) the review of disclosures, information, and data present in the preliminary version of the sustainability report; (ii) interviews with strategic collaborators, both to understand the report data and the management processes involved with the material issues; and (iii) review of complementary documentation sent by CEMIG to BVC. General company data and the report preparation methodology are provided in Cemig's sustainability report and are, therefore, subject to verification.
C2. Risks and opportunities	Other, please specify (Timeframes, kinds of risk)	Annual independent verification of the Cemig's Sustainability Report is based on the best practices laid down in the GRI Standards Principles for Sustainability Reports and the ISAE3000 assurance standard.	Annually, Cemig submits its Sustainability Report to independent verification, to ensure the legitimacy of its content. The audit process comprised (i) the review of disclosures, information, and data present in the preliminary version of the sustainability report; (ii) interviews with strategic collaborators, both to understand the report data and the management processes involved with the material issues; and (iii) review of complementary documentation sent by CEMIG to BVC. The chapter on Climate Change of the Sustainability Report provides the timeframes considered by the Company in its risk assessments, together with some examples of identified climate risks.
C3. Business strategy	Renewable energy products	Annual independent verification of the Cemig's Sustainability Report is based on the best practices laid down in the GRI Standards Principles for Sustainability Reports and the ISAE3000 assurance standard.	Annually, Cemig submits its Sustainability Report to independent verification, to ensure the legitimacy of its content. The audit process comprised (i) the review of disclosures, information, and data present in the preliminary version of the sustainability report; (ii) interviews with strategic collaborators, both to understand the report data and the management processes involved with the material issues; and (iii) review of complementary documentation sent by CEMIG to BVC. In the Sustainability Report, Cemig provides strategic decisions taken in 2019, influenced by business opportunities, leveraged by climate change: Those include: o Cemig's performance as trader of renewable (wind and solar) energies, as seen by participation in the Incentivized Solar and Wind Energy Purchase Auction; o Cemig's consolidation in the distributed generation business by the opening of wholly-owned subsidiary Cemig SIM, with solar photovoltaic facilities in a partnership model; o boosting of Cemig's R&D program, moving on with Cemig 4.0 Program projects and opening new bid notices for innovative proposals in 2019.
C4. Targets and performance	Other, please specify (Progress towards the emission reduction target )	Annual independent verification of Cemig's Greenhouse Gas Emissions Inventory is based on ISO 14064-3.	Annually, Cemig submits its Corporate GHG Inventory for independent verification. The objective of third party verification of the inventory is to obtain an independent statement on its quality and the consistency of the information contained therein, in order to ensure its users an accurate assessment of the emission pattern of the organization's value chain. Progress in relation to emission reduction goals and the justification for such performance are reported in Cemig's Inventory.
C5. Emissions performance	Other, please specify (Standards, protocols and methodologies used in the calculating Scope 1 & 2 emissions.)	Annual independent verification of Cemig's Greenhouse Gas Emissions Inventory is based on ISO 14064-3.	Annually, Cemig submits its Corporate GHG Inventory for independent verification. The objective of third party verification of the inventory is to obtain an independent statement on its quality and the consistency of the information contained therein, in order to ensure its users an accurate assessment of the emission pattern of the organization's value chain. References and methodology used to prepare the inventory are provided in the report, and thus, submitted to verification.
C7. Emissions breakdown	Year on year change in emissions (Scope 1 and 2)	Annual independent verification of Cemig's Greenhouse Gas Emissions Inventory is based on ISO 14064-3.	Annually, Cemig submits its Corporate GHG Inventory for independent verification. The objective of third party verification of the inventory is to obtain an independent statement on its quality and the consistency of the information contained therein, in order to ensure its users an accurate assessment of the emission pattern of the organization's value chain. In GHG inventory, Cemig emissions in 2019 are compared to emissions from 2018 & 2014.
C7. Emissions breakdown	Year on year change in emissions (Scope 3)	Annual independent verification of Cemig's Greenhouse Gas Emissions Inventory is based on ISO 14064-3.	Annually, Cemig submits its Corporate GHG Inventory for independent verification. The objective of third party verification of the inventory is to obtain an independent statement on its quality and the consistency of the information contained therein, in order to ensure its users an accurate assessment of the emission pattern of the organization's value chain. In GHG inventory, Cemig emissions in 2019 are compared to emissions from 2018 & 2014.
C8. Energy	Energy consumption	Annual independent verification of Cemig's Greenhouse Gas Emissions Inventory is based on ISO 14064-3.	Annually, Cemig submits its Corporate GHG Inventory for independent verification. The objective of third party verification of the inventory is to obtain an independent statement on its quality and the consistency of the information contained therein, in order to ensure its users an accurate assessment of the emission pattern of the organization's value chain. Energy consumption data are used in calculating Cemig's GHG emissions are, therefore, subject to verification.

**C11. Carbon pricing****C11.1****(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?**

No, but we anticipate being regulated in the next three years

**C11.1d****(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?**

Brazil has no carbon taxation system. However, Cemig is preparing to act in accordance with a possible carbon pricing system in Brazil by monitoring changes in regulations via Fiemg's Climate Change Working Group. The expectation is that this will occur over a period of 3 to 5 years.

Also, Cemig participates in the PMR Brazil Project Advisory Committee, which studies the paths for carbon pricing in Brazil. A PMR definition on the carbon pricing system in Brazil is still expected. Expectations are that all scheduled components will be complete by 2020. Faced with a scenario of political uncertainty with the current federal government, it is not known whether the carbon pricing agenda will be taken forward. Cemig monitors the matter in order to prepare for the entry into force of a carbon tax regulation in the coming years.

## C11.2

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**(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?**

Yes

## C11.2a

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**(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.**

**Credit origination or credit purchase**

Credit origination

**Project type**

Hydro

**Project identification**

Cemig has Clean Development Mechanism - CDM projects that adopt an internal carbon price to analyze the feasibility of new projects. The organization has projects in different stages to obtain the Reduced Emission Certificate - CER for hydroelectric plants (Hydro Power Plants - HPPs and Small Power Plants - SPPs) and solar plants. For instance, in 2016, 167.097 credits for SPP Cachoeirão were issued (27 MW, where Cemig has a 49% equity interest), while in 2014 1,057,929 credits for HPP Santo Antônio were issued (3,568 MW, where Cemig has a 15% equity interest). In 2019, the organization did not issue any carbon credits.

**Verified to which standard**

CDM (Clean Development Mechanism)

**Number of credits (metric tonnes CO<sub>2</sub>e)**

0

**Number of credits (metric tonnes CO<sub>2</sub>e): Risk adjusted volume**

0

**Credits cancelled**

No

**Purpose, e.g. compliance**

Voluntary Offsetting

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## C11.3

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**(C11.3) Does your organization use an internal price on carbon?**

Yes

## C11.3a

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**(C11.3a) Provide details of how your organization uses an internal price on carbon.**

**Objective for implementing an internal carbon price**

Navigate GHG regulations  
Drive low-carbon investment  
Identify and seize low-carbon opportunities

**GHG Scope**

Scope 1

**Application**

By means of Service Instruction IS-56 ("Carbon risk assessment in due diligence operations"), Cemig laid down the procedures for analyzing carbon risk in carrying out its due diligences related to the acquisition, merger, and implementation of new assets that use fossil fuels for power generation. The objective is to assess the impact of greenhouse gas (GHG) emissions on Cemig's businesses, resulting from the purchase of assets in operation or in project or construction phase, in addition to the risks and opportunities with regard to climate change and the needs to mitigate its effects on the company.

**Actual price(s) used (Currency /metric ton)**

43.89

**Variance of price(s) used**

The internal carbon price used in the analyzes is based on a basket of carbon price values that considers the following parameters: (i) geographical location, based on prices in countries in the same region as Brazil (Latin America) and (ii) sectorial parameter, based on prices practiced by companies in the same sector as Cemig (companies from Brazil and other countries). Estimated value of this new methodology is \$ 10.50/tCO<sub>2</sub>

**Type of internal carbon price**

Shadow price

**Impact & implication**

When assessing the acquisition, merger, or implementation of projects that use fossil fuels, Cemig carries out internal analyzes regarding the carbon risk and its financial impact on the Company. Applying this evaluation criterion for TPP Igarapé, it was observed that the decommissioning of the plant carried out at the end of 2019 brought to Cemig a benefit of reducing the carbon cost of the company's operations. CEMIG has medium- and long-term guidelines (until 2040) to expand the capacity of solar, wind, and thermal generation using natural gas. At this time, the company is evaluating opportunities for these investments and the carbon risk assessment defined in Service Instruction (IS-56) "Carbon risk assessment in Due Diligence operations" will be used as a criterion for analyzing the viability of the business.

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## C12. Engagement

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### C12.1

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#### (C12.1) Do you engage with your value chain on climate-related issues?

- Yes, our suppliers
- Yes, our customers
- Yes, other partners in the value chain

### C12.1a

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#### (C12.1a) Provide details of your climate-related supplier engagement strategy.

##### Type of engagement

Information collection (understanding supplier behavior)

##### Details of engagement

Collect climate change and carbon information at least annually from suppliers

##### % of suppliers by number

75

##### % total procurement spend (direct and indirect)

10

##### % of supplier-related Scope 3 emissions as reported in C6.5

0.35

##### Rationale for the coverage of your engagement

The transportation and distribution (downstream) category of CEMIG's GHG Inventory includes fuel consumption data (alcohol, gasoline, and diesel) used by contractors working for CEMIG D. In the 2019 Inventory, 15 contractors (amounting to 75% of CEMIG D's current contracts) contributed this data voluntarily. There is no cost to CEMIG for this type of engagement (since the request is friendly and the report is voluntary). However, the company believes that it is a worthwhile effort to verify climate issues with suppliers.

##### Impact of engagement, including measures of success

Currently, CEMIG monitors both the data reported by the contractors (fuel consumption) and the number of contractors engaged in collaborating with data for the GHG Inventory. In this sense, the success of the engagement is measured by the percentage of third parties who report their consumption to Cemig's GHG Inventory. The impact of this engagement in general results in awareness about the use of fossil fuels, generating a reduction in GHG emissions. It is expected this monitoring to be carried out soon with a greater degree of proximity, encouraging best practices in climate change management. The amount of direct and indirect spending (10%) corresponds to an estimate of the time invested in the preparation and verification of the suppliers' emissions. Cemig is developing an environmental performance indicator for suppliers, which included, among other aspects, emissions management.

##### Comment

N/A

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### C12.1b

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#### (C12.1b) Give details of your climate-related engagement strategy with your customers.

##### Type of engagement

Education/information sharing

##### Details of engagement

Run an engagement campaign to educate customers about the climate change impacts of (using) your products, goods, and/or services

##### % of customers by number

1

##### % of customer - related Scope 3 emissions as reported in C6.5

0

##### Portfolio coverage (total or outstanding)

<Not Applicable>

##### Please explain the rationale for selecting this group of customers and scope of engagement

Cemig develops several actions to raise awareness of the use of energy in order to combat waste through the Energy Efficiency Program - PEE. Together with its residential, service and commercial customers, the Company promotes several awareness campaigns on the efficient use of electricity. These campaigns are run on various media - television, radio, newspaper, the Internet, social networks, and on energy bills sent to customers. The Projects are selected through a Public Call process carried out annually with resources segregated by grade (residential, industrial, commerce and services, public authorities, public services, and public lighting). Approved proposals are funded with resources from the Program; The residual funds of the public call process are used to finance projects prepared directly by Cemig. In these projects, Cemig seeks to meet the universalization criterion; that is, it plans to serve all public schools in the concession area in the next cycle, as well as all municipal daycare centers and public hospitals. The value of 1% corresponds to the number of Cemig's customers who were directly impacted (received direct actions) by the Program. In the case, of a total of 8,537,725 consumers, 83,345 consumers (or 1% of the total) were engaged. The value of 0.002% corresponds to the emissions avoided by the PEE (11,000 tCO2e) divided by the total Scope 3 emissions (6,451,461 tCO2e)

**Impact of engagement, including measures of success**

The impact of this engagement strategy is an increase in the rational use of energy by Company customers. The measurement of results is carried out through positive feedbacks received from customers, reporting the savings obtained from information received on the rational use, and environmental benefits of that initiative. The tangibility of this strategy is measured by energy savings of Cemig's Energy Efficiency Program customers. In 2019, R\$ 86 million was invested in implementing new technologies and boosting the culture of rational use of energy through awareness raising and use of more efficient equipment. These energy efficiency actions include low-income families, hospitals, non-profit entities, rural residents, educational institutions, and public bodies, achieving savings of 126,000 Mwh.

**Type of engagement**

Collaboration & innovation

**Details of engagement**

Other, please specify (Engagement through CEMIG SIM)

**% of customers by number**

100

**% of customer - related Scope 3 emissions as reported in C6.5**

0

**Portfolio coverage (total or outstanding)**

<Not Applicable>

**Please explain the rationale for selecting this group of customers and scope of engagement**

CEMIG SIM presentations and attitude are always geared to the matter of Sustainability through energy efficiency, and the consequent reduction of emissions. Thus, all Cemig SIM customers (100% of them) are engaged in this way. CEMIG SIM business format includes several partnerships with private companies for the construction of solar plants, in addition to other customers. An example of CEMIG SIM's engagement actions involves the MG manufacturer union via a partnership with the MG Manufacturers Federation (FIEMG). FIEMG's energy executive advisory board sends questionnaires to the Unions, which in turn send them to small- and medium-sized member manufacturers. The manufacturers answer the questionnaire and the executive energy consultancy analyzes, guides, and makes diagnoses, so the unions can pass on the opportunities to reduce energy costs to the manufacturers. Given the options, the manufacturer chooses the one that best suits it and may enter into an agreement with Cemig SIM.

**Impact of engagement, including measures of success**

This engagement is expected to result in a reduction in energy costs of around 15%, without the need for investments by the companies. The impacts will be measured by the number of contracts entered into with Cemig SIM.

**C12.1d****(C12.1d) Give details of your climate-related engagement strategy with other partners in the value chain.**

Cemig promotes the engagement of its (in-house and third party) employees through internal campaigns on the rational use of energy within the Company's facilities, correlating energy efficiency with the reduction of GHG emissions, in the same line of approach adopted with its customers. Internal campaigns are carried out by banners and posters at Cemig's headquarters and offices across the State and digital media in existing communication channels, such as the login screen, Intranet, Cemig OnLine and Energia da Gente (Cemig's digital news bulleting, aimed at the internal public). For example, in 2019 Cemig offered the distance learning course "Safe Use of Energy", lasting 40 hours. The objectives of the course were: i) To promote the population's awareness regarding the necessary care to live with the power networks, avoiding accidents and saving lives; ii) Expand knowledge about the electrical power system; iii) Share information about the risks of electricity; iv) Develop security concepts in the use of electricity. The course covered topics such as Energy Paths (Generation, Transmission and Distribution); Electric Power System; Prevention tips inside and outside the home. In 2019, a total of 1094 employees completed the course, with 750 own employees and 344 third parties.

In addition to projects that aim to directly reduce electricity consumption, Cemig also carries out other projects of an exclusively educational nature that seek to engage society and, especially, the school public, on sustainability issues via courses and the rational use of energy electricity, in addition to the use of photovoltaic energy in these spaces. For the internal public, Cemig recently developed a remote learning course with the aim of disseminating best practices and knowledge involving the use of electricity.

**C12.3****(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?**

- Direct engagement with policy makers
- Trade associations
- Funding research organizations

## C12.3a

### (C12.3a) On what issues have you been engaging directly with policy makers?

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Other, please specify (Mitigation and adapting to climate change)	Support	The Belo Horizonte City Hall, concerned with establishing local mitigation and adaptation policies to the effects of climate change, instituted the Municipal Committee on Climate Change and Eco-efficiency-CMMCE, through Municipal Decree 12,362 of 03/May/2006. CMMCE is a collegiate and consultative body aimed at supporting deployment of the municipal policy of the City of Belo Horizonte for climate change, acting in the articulation of public policies and private initiatives aimed at reducing greenhouse gas emissions. Greenhouse and air pollutants, decrease production of solid waste and increasing efficiency in the processes of reuse and recycling of waste, encouraging the use of renewable energy sources, improving energy efficiency and rational use of energy, and boosting environmental awareness of citizens. It includes representatives of Municipal and State Government, civil society, non-governmental organizations, the business and academic sectors, which guarantees legitimacy to the population's participation in various decisions related to the search for environmental sustainability in the City. Thus, CMMCE's role is to propose and deliberate on municipal climate protection policies and raise awareness and mobilize society to discuss and take a position on the problems arising from climate change in our municipality, with a view to inclusive and sustainable development and enhancing quality of life for all citizens. Cemig attends CMMCE Belo Horizonte meetings and, in 2018, contributed to drafting the new municipal law on tackling climate change.	Cemig unqualifiedly backs this legislation
Other, please specify (Mitigation and adapting to climate change)	Support	The Municipal Committee for Climate Change and Ecoefficiency of Betim (CMMCE) acts in the discussion of public and private initiative policies, proposing changes in attitudes that reduce emissions of greenhouse gases and air pollutants, in addition to reducing the production of solid waste and, thus, its reuse and recycling. The committee fosters actions to boost incentives to use renewable energy sources, promote the rational use of energy and, consequently, increase environmental awareness of citizens. Cemig's engagement with CMMCE Betim happens through the company's participation in its meetings.	Cemig unqualifiedly backs this legislation.

## C12.3b

### (C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?

Yes

## C12.3c

### (C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

#### Trade association

Brazilian Business Council for Sustainable Development (CEBDS)

#### Is your position on climate change consistent with theirs?

Consistent

#### Please explain the trade association's position

CEBDS includes the Thematic Chamber for Energy and Climate Change (CTClima), where Cemig has a chair. CTClima represents the vision of CEBDS member companies on issues related to climate change, in debates and formulation of public policies with governments and other stakeholders. CTClima's mission is "to be a suitable venue for Companies to understand their role in the context of climate change, helping them to develop strategies that leverage opportunities and minimize risks, and preparing them for a world with restrictions on greenhouse gas emissions". CEBDS carries out several activities related to the theme, which can contribute to the drafting and improvement of public policies regarding this theme. In 2019, the topic of renewable energy was widely discussed at CEBDS through events and publications.

#### How have you influenced, or are you attempting to influence their position?

Cemig's representative at Thematic Chamber on Energy and Climate Change (CTClima) participates in meetings, discussions, and debates, contributing, when applicable, with suggestions for drafting of public policies. Also, Cemig follows the initiatives and provides data for preparation of studies such as the publication "How companies have contributed to the Paris Agreement | 2019, CEBDS"

## C12.3d

### (C12.3d) Do you publicly disclose a list of all research organizations that you fund?

Yes

## C12.3f

### (C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

Cemig's institutional relationship with public policy makers regarding climate change is carried out by the Supervisory Boards of the specific strategic objective and the corporate risk associated to the time, after approval by the Executive Board. These Supervisory Boards are updated on the Company strategy and Master Plan during the Strategic Planning annual cycle. As told in question C1.1a, the person directly responsible for the climate change Global Strategy at Cemig is the Deputy Director. Therefore, all direct and indirect activities the Company participates in related to the public policy development are assessed, finally, by their team after approval by the Director of the area in charge.

In CEBDS (Brazilian Corporate Council for Sustainable Development) Leader Council, for instance, Cemig is represented by its Deputy Director, who shares the Company vision with other leaderships of large Brazilian corporations, the several government levels, and the society. Participation of the Deputy Director in the Leader Council ensures company activities match the global climate change strategy. Also, as a basic assumption, all Cemig institutional activities are carried out according to guidelines in the document "[10 Climate initiatives](#)".

Also, employees get annual training on CEMIG's "Declaration of Ethical Principles and Code of Professional Conduct", where they get guidelines to help them align their conduct with the company views on the subject. Besides that, there is a whistleblowing channel where situations involving violations of the ethics code are looked into by CEMIG's Ethics Committee.

## C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

**Publication**

In mainstream reports

**Status**

Complete

**Attach the document**

2019report.pdf

**Page/Section reference**

RAS 2019, Climate Change chapter - page 271

**Content elements**

Governance

Strategy

Risks & opportunities

Emissions figures

Emission targets

Other metrics

**Comment**

N/A

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**Publication**

In other regulatory filings

**Status**

Complete

**Attach the document**

CEMIG Form 20-F\_2019.pdf

**Page/Section reference**

Form 20-F

**Content elements**

Governance

Strategy

Risks & opportunities

Other metrics

**Comment**

N/A

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**Publication**

In voluntary communications

**Status**

Complete

**Attach the document**

Relatório\_INV CEMIG\_2020-05-13\_Inglês.pdf

**Page/Section reference**

Green House Gas Inventory – Year 2019. All chapters

**Content elements**

Emissions figures

Emission targets

Other metrics

**Comment**



## C15. Signoff

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### C-FI

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**(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.**

### C15.1

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**(C15.1) Provide details for the person that has signed off (approved) your CDP climate change response.**

	Job title	Corresponding job category
Row 1	Diretor Adjunto	Other C-Suite Officer

### Submit your response

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**In which language are you submitting your response?**

English

**Please confirm how your response should be handled by CDP**

	I am submitting to	Public or Non-Public Submission
I am submitting my response	Investors Customers	Public

**Please confirm below**

I have read and accept the applicable Terms