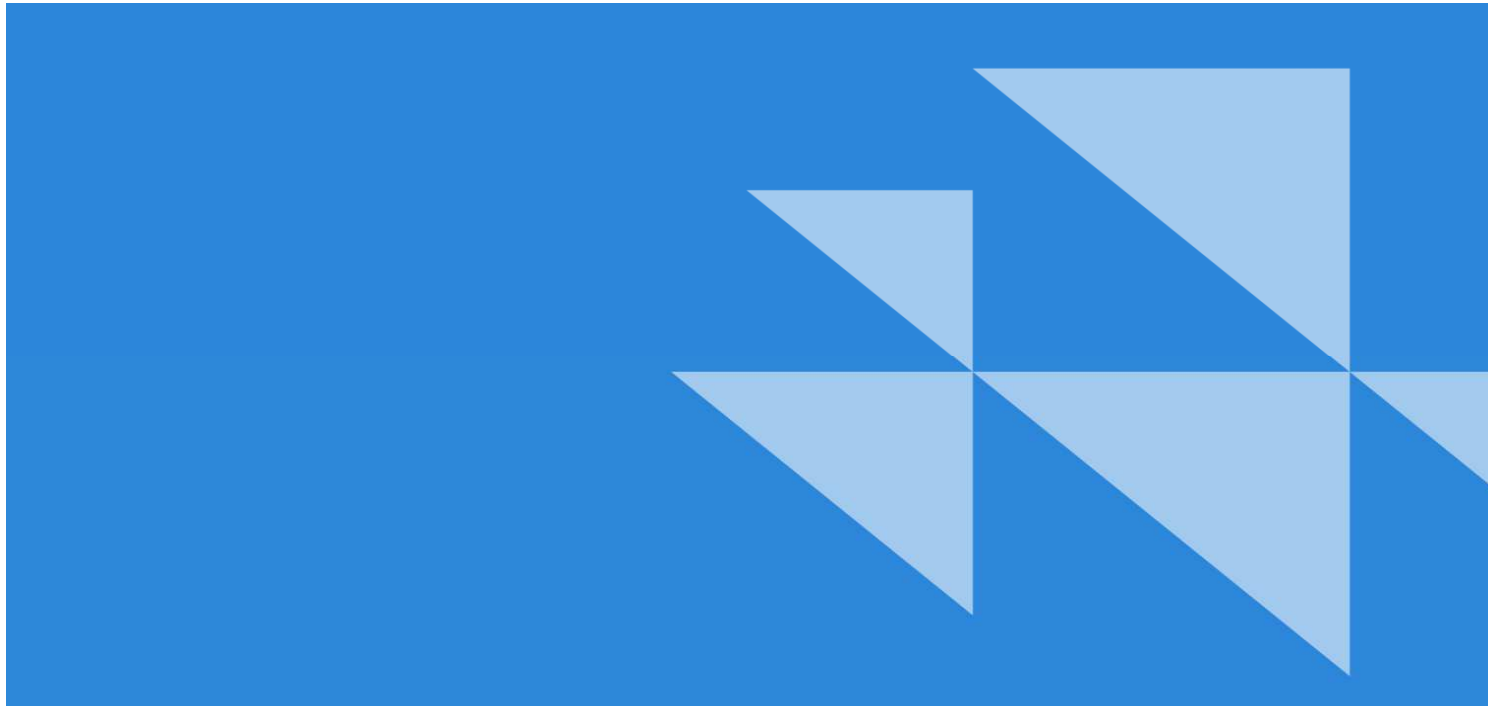

CDP Water Security 2019 Questionnaire



Welcome to your CDP Water Security Questionnaire 2019

W0. Introduction

W0.1

(W0.1) Give a general description of and introduction to your organization.

Founded in 1952 by the then governor of Minas Gerais, Juscelino Kubitschek de Oliveira, Companhia Energética de Minas Gerais (Cemig) operates in the fields of generation, transmission, commercialization and distribution of electricity, energy solutions (Efficientia S.A.) and distribution of natural gas (Gasmig). The group consists of the holding, 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 175 Companies, 15 Consortia and 2 FIPs (Investment Funds in Shares), resulting in assets present in 22 Brazilian states and the Federal District. Since its foundation, the Company has assumed the role of bringing the collective welfare to the regions where it operates in an innovative and sustainable way. This determination led to its position as the largest power distributor in lines extension and networks, and one of the largest power generation and power transmission Companies in the country. Cemig also has operations in exploration and distribution of natural gas (Gasmig) and data transmission (Cemig Telecom). Cemig holds 26.06% direct and 22.80% indirect interest in Light S.A., an energy distributor working in 31 municipalities in the State of Rio de Janeiro, covering a region with more than 11 million consumers. It also has a 36.97% interest in Empresa de transmissão Transmissora Aliança de Energia Elétrica S.A. (Taesa), which gives it control of this company, and 34.15% of the total capital, in addition to 6.8% indirectly through of Light, of Renova Energia S.A.

Cemig is a publicly-held company controlled by the Government of the State of Minas Gerais (51%) and its shares are traded in São Paulo, BM&FBovespa SA, New York, New York Stock Exchange (NYSE), and in Madrid, the Latin American Stock Market (Latibex). Consolidated net operating revenue of the Company reached R\$ 21.71 billion in 2017, based on a matrix, which main source of energy are renewable resources.

Cemig's generating plant has an installed capacity of 5,727 MW, of which 99.30% refers to hydraulic generation; 0.20%, to thermal generation; 0.50% to wind generation; and 0.01%, to solar generation. The Company has 5,287 km of transmission lines. In the field of electricity distribution, it is responsible for the management of the largest electricity distribution network in Latin America, with more than 529 thousand km of extension. At the end of 2017, Cemig had 5,864 employees.

For its commitment to principles of social and environmental responsibility, its economic and financial strength and technical excellence, the Company is internationally recognized as a reference in sustainability in its sector and is positioned as one of the main consolidation vectors of the Brazilian electricity industry. Cemig has been part of Dow Jones Sustainability Index (DJSI World) for 18 years since its implementation. For the 13th consecutive year, it also participated in the BM&FBovespa Corporate Sustainability Index (ISE) and was selected for the 8th time to compose the Carbon Efficient Index (ICO2), created

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 in 2010 by BM&FBovespa and BNDES. In 2018, Cemig was listed among the leading Companies in climate change and water safety management in Latin America. The recognition was given by CDP Latin America. This is the consecutive seventh year that CDP rewards the Company. The selection took into consideration the level of detail of the answers in relation to the criteria such as risk management, commitment with mitigation, and GHG emission reduction initiatives. The best results indicate a high level of transparency to release information on the topic, giving investors a consistent content on climate change and water safety management.

W-EU0.1a

(W-EU0.1a) Which activities in the electric utilities sector does your organization engage in?

- Electricity generation
- Transmission
- Distribution

W-EU0.1b

(W-EU0.1b) For your electricity generation activities, provide details of your nameplate capacity and the generation for each power source.

	Nameplate capacity (MW)	% of total nameplate capacity	Gross generation (MWh)
Coal – hard	0	0	0
Lignite	0	0	0
Oil	131	2.14	23,288
Gas	0	0	0
Biomass	0	0	0
Waste (non-biomass)	0	0	0

	Nameplate capacity (MW)	% of total nameplate capacity	Gross generation (MWh)
Nuclear	0	0	0
Geothermal	0	0	0
Hydroelectric	5,883	96	14,856,259
Wind	115	1.88	324,978
Solar	1	0.02	1,586
Other renewable	0	0	0
Other non-renewable	0	0	0
Total	6,130	100	15,206,121

W0.2

(W0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date
Reporting year	January 1, 2018	December 31, 2018

W0.3

(W0.3) Select the countries/regions for which you will be supplying data.

Brazil

W0.4

(W0.4) Select the currency used for all financial information disclosed throughout your response.

BRL

W0.5

(W0.5) Select the option that best describes the reporting boundary for companies, entities, or groups for which water impacts on your business are being reported.

Companies, entities or groups over which operational control is exercised

W0.6

(W0.6) Within this boundary, are there any geographies, facilities, water aspects, or other exclusions from your disclosure?

No

W1. Current state

W1.1

(W1.1) Rate the importance (current and future) of water quality and water quantity to the success of your business.

	Direct use importance rating	Indirect use importance rating	Please explain
Sufficient amounts of good quality freshwater available for use	Vital	Not very important	<p>Direct Use: Cemig's generation plants are predominantly composed of hydroelectric plants with 3,500 km² of reservoirs, representing 96.6% of the Company's installed capacity. Thus, the amount of water is of fundamental importance so as not to harm the generation of energy. The amount of water is sensitive to climatic variations, vulnerable to the consequences of the exploitation of other natural resources, is greatly affected by human actions and is subject to the regulatory environment. Thermal plants also depend on water, albeit in much smaller volumes.</p> <p>In the future (2021-2040), Cemig's water dependence will remain high, as the company will continue with a percentage above 90% of installed capacity in hydroelectric plants. However, the Company is reducing its dependence on water by diversifying investments in its generating matrix, prioritizing Distributed Generation projects, and encouraging the purchase of wind, solar and biomass energy in the auctions with third parties.</p> <p>Indirect Use: The Company performs the geographical mapping of its critical suppliers (contractors), identifying if they are located in areas of water stress. The main use of water by contractors is in the process of preparing and curing concrete. However, the water used may be of lower quality. The location of the contractors in places that are not exposed to water stress and the non-dependence of good quality water led to the classification of selected importance.</p>

	Direct use importance rating	Indirect use importance rating	Please explain
Sufficient amounts of recycled, brackish and/or produced water available for use	Not very important	Not very important	<p>Direct Use: Most of Cemig's energy generation has no consumptive use of water. There is a low consumption in its operations, only in a thermoelectric plant (UTE Igarapé) and in administrative activities, with the water recirculation rate considered insignificant in these operations.</p> <p>In 2017, Cemig promoted the Illuminated Idea Contest, which aimed to promote solutions aimed at reducing fuel consumption, efficiency in energy consumption, water and reducing waste generation. Of the 44 projects registered by Cemig employees, the prize was a rainwater harvesting system for the Company's main building in the Vila Mariana neighborhood of Governador Valadares. The project was inaugurated in December 2018. In addition, brackish water is not used by Cemig and Companhia does not produce water. Thus, the classification of importance of direct use was considered not very important.</p> <p>Indirect Use: The percentage of recycling is considered insignificant in the operations of critical suppliers of the Company.</p> <p>In addition, brackish water is not used by the Company's critical suppliers and they do not produce water. Thus, the classification of importance of indirect use was considered not very important.</p>

W1.2

(W1.2) Across all your operations, what proportion of the following water aspects are regularly measured and monitored?

	% of sites/facilities/operations	Please explain
Water withdrawals – total volumes	100%	Cemig monitors the abstraction of water by source (public supply, artesian well and superficial capture) in all its operations and administrative buildings. The monitoring of this water aspect is carried out monthly by means of hydrometers. In all facilities, the bi-annual monitoring to control the quality of water for human consumption is in compliance with Ministry of Health Ordinance No. 05 of 09/28/2017.
Water withdrawals – volumes from water stressed areas	100%	Recently, the water catchment area of the Paranaíba River has been under great pressure by the users of irrigation in order to increase more and more the flows of consumptive uses taken for irrigation. In this context, besides other hydroelectric plants located in the basin, there is the Emborcação HPP, belonging to Cemig. Each time the upstream consumptive uses are increased in the basin, downstream hydroelectric plants may suffer physical guarantee losses in periodic reviews, with a direct impact on their revenues. Just to give you an idea, estimates of impact for Emborcação HPP, in the next physical warranty review, expected to occur in the year 2022, are of the order of 2.0% of the plant's physical guarantee. This is only due to the increase in upstream consumptive uses.
Water withdrawals – volumes by source	100%	Cemig monitors the abstraction of water by source (public supply, artesian well and superficial capture) in all its operations and administrative buildings. The monitoring of this water aspect is carried out monthly by means of hydrometers. Semiannual monitoring is also carried out to control the quality of water for human consumption in accordance with Ministry of Health Ordinance No. 05 of 09/28/2017.

	% of sites/facilities/operations	Please explain
Water withdrawals quality	100%	In line with the guidelines of the Company's Biodiversity Policy, which are designed to create more efficient strategies for biodiversity conservation and meet state and federal resolutions, Cemig performs Water Quality Monitoring. identification and collection of information for assessment and control of environmental impacts on aquatic ecosystems in all phases of their projects - from project design to operation. The water quality of Cemig reservoirs is monitored quarterly in a network that includes 47 reservoirs and more than 200 physical, chemical and biological data collection stations in the main hydrographic basins of Minas Gerais.
Water discharges – total volumes	100%	Cemig's effluents are generated only in its administrative processes. At UTE Igarapé, the water returns to the water course after being used. On the other hand, the effluents generated in the administrative units are discarded in the public network or destined to controlled septic tanks, not directly affecting any watercourse. The monthly estimate for the volumes is based on the principles of the Brazilian standard NBR 7229. The discharge quality monitoring is semester, since the volume and environmental impact of this effluent is low. Only effluent from the water and oil separator box is monitored monthly.
Water discharges – volumes by destination	100%	Cemig estimates, on a monthly basis, the volume of effluents discarded in sewage and in its effluent treatment plants, using the principles of the Brazilian standard NBR 7229.

	% of sites/facilities/operations	Please explain
Water discharges – volumes by treatment method	100%	<p>100% of the effluents from sanitary facilities is delivered to conventional treatment systems offered by local concessionaires and does not represent a risk to water bodies. The utilities monitor treated effluents daily.</p> <p>Regarding the effluents from the generation and cooling of equipment in hydroelectric plants, for most installations the used water is withdrawn into the water outlet and discharged into the leakage channel system, with a bypass, but no measurement. These uses are non-consumptive and the disposal of water is directly into the body of water.</p> <p>Regarding the Igarapé TPP, part of its effluent is classified as an industrial effluent. In this project there is an internal effluent treatment process, which performs pH adjustment, removal of suspended solids and oils and greases - before being released into the receiving body. The water quality of the receiving body - Rio Paraopeba - downstream of the launch is monitored monthly to ensure compliance with legislation.</p>
Water discharge quality – by standard effluent parameters	100%	<p>100% of the effluents from sanitary facilities is delivered to conventional treatment systems, offered by local concessionaires and does not represent a risk to water bodies. The utilities monitor the treated effluents daily.</p> <p>Regarding the effluents from the generation and cooling of equipment in hydroelectric plants, for most installations the used water is withdrawn into the water outlet and discharged into the leakage channel system with a bypass, but no measurement. These uses are non-consumptive and the disposal of water is directly into the body of water.</p> <p>At Igarapé TPP, part of its effluent is as an industrial effluent with an internal treatment process, which performs pH adjustment, removal of suspended solids and oils and greases before being released into the receiving body. The water quality of the receiving body - Rio Paraopeba - downstream of the launch is monitored monthly.</p>

	% of sites/facilities/operations	Please explain
Water discharge quality – temperature	100%	<p>Cemig conducts monthly monitoring of the water temperature, upstream and downstream of its industrial operations, so that the Company can identify if there is any impact being caused to the waterways. This monitoring acts as an evaluation of the quality of the Company's effluent management, aiming at the adaptation of effluent parameters to those defined by the legislation.</p> <p>In relation to effluents from sanitary facilities, 100% of the effluent is fed to conventional treatment systems, offered by local concessionaires and does not represent a risk to water bodies. Therefore, the temperature parameter is not relevant for these effluents.</p>
Water consumption – total volume	100%	<p>From the monthly monitoring of water abstraction and waste disposal in all its operations, Cemig is able to monitor its total water consumption.</p>
Water recycled/reused	100%	<p>Most of Cemig's energy generation has no consumptive use of water. Only in the Igarapé thermoelectric plant and in the administrative activities that the company has water consumption, the rate of water recirculation considered insignificant in these operations.</p>
The provision of fully-functioning, safely managed WASH services to all workers	100%	<p>O fornecimento de serviços de água, saneamento e higiene atendem perfeitamente e é gerenciado de modo seguro para todos os funcionários. Em todos os bebedouros da empresa são realizadas análises trimestrais de água para verificar o atendimento aos padrões estabelecidos na Portaria do Ministério da Saúde N°05 de 28/09/2017. Todas as unidades da empresa possuem saneamento adequado.</p>

W-EU1.2a

(W-EU1.2a) For your hydroelectric operations, what proportion of the following water aspects are regularly measured and monitored?

	% of sites/facilities/operations measured and monitored	Please explain
Fulfilment of downstream environmental flows	100%	<p>Cemig has an area dedicated to the management of water resources, which through planning adopts operational measures in its hydroelectric plants that aim to calculate the optimal generation of each plant, guaranteeing the best use of water for generation, without impacting other uses of the basin area. For each hydroelectric plant there is an Operational Instruction that defines its technical and operational parameters.</p> <p>The company also carries out integrated river basin management initiatives where it has ventures, through participation in the National and State Councils of Water Resources, River Basin Committees, Technical Chambers and Working Groups, together with representatives of the public power, other users of resources and organized civil society.</p>
Sediment loading	100%	<p>Cemig monitors the sediment load at 86 stations located at its power plants, where water samples are collected and analyzed in an accredited laboratory. These analyzes allow the Company to evaluate the useful life of the reservoirs.</p>
Other, please specify	Not relevant	<p>Cemig has no other water aspects that are deemed relevant.</p>

W1.2b

(W1.2b) What are the total volumes of water withdrawn, discharged, and consumed across all your operations, and how do these volumes compare to the previous reporting year?

	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Total withdrawals	136,164,070	Higher	<p>Total volume affluent to the Cemig mills in the year 2018.</p> <p>The following rationale was used to classify the variations: Almost the same = 0 to 10% Greater / smaller = 11 to 55% Much larger / much smaller = 56 to 100%.</p> <p>In 2017, the value was 97,132,810 megaliters / year.</p> <p>The value of 2018 was higher than that of 2017 due to the better hydrological conditions verified in 2018.</p> <p>In the future (2021-2040), it is expected that there will be no significant variations of this volume, since, Cemig will continue to maintain the 96% proportion of its energy source in a hydropower source, coming from 83 hydroelectric plants (21 UHEs and 62 PCHs),</p> <p>In the scenarios of climate change, there is no assertive indication regarding the change in water availability in the regions where the main Cemig plants are installed</p>
Total discharges	131,583,336	Higher	<p>Total volume affluent to the Cemig mills in the year 2018.</p> <p>In 2017, the value was 101,657,085 megaliters / year.</p> <p>The value of 2018 was higher than that of 2017 due to the higher affluent volume in 2018.</p> <p>In the future (2021-2040), it is expected that there will be no significant variations of this volume, since, Cemig will continue to maintain the 96% proportion of its energy source in a hydropower source, coming from 83 hydroelectric plants (21 UHEs and 62 PCHs).</p>

	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Total consumption	4,580,734	Much higher	<p>In 2017, the value was -4,524,275 Megaliters. Since in 2017 there was a depletion of the reservoirs, the total consumption in that year was negative.</p> <p>As early as 2018, as the hydrological conditions were better than those of 2017, there was an improvement in the storage conditions of the reservoirs.</p> <p>In the future (2021-2040), it is expected that there will be no significant variations of this volume, since, Cemig will continue to maintain the 96% proportion of its energy source in a hydropower source, coming from 83 hydroelectric plants (21 UHEs and 62 PCHs).</p> <p>In the scenarios of climate change, there is no assertive indication regarding the change in water availability in the regions where the main Cemig plants are installed.</p>

W1.2d

(W1.2d) Provide the proportion of your total withdrawals sourced from water stressed areas.

	% withdrawn from stressed areas	Comparison with previous reporting year	Identification tool	Please explain
R o w 1	1.6	Higher	Other, please specify Siságua	<p>The Emborcação HPP, belonging to Cemig, is located in the Paranaíba river basin, which has been under great pressure by irrigation users in order to increase the flow of consumptive uses taken for irrigation. Impact estimates for Emborcação HPP, in the next physical warranty review, expected to occur in 2022, are of the order of 2.0% of the plant's physical guarantee. This is only due to the increase in upstream consumptive uses.</p> <p>The collections for the monitoring of the water quality generate volume of information that is analyzed and stored, forming an extensive database, named Siságua. With the purpose of translating and facilitating communication with the lay public, Cemig uses and makes available, through the Sistema Siságua, the Water Quality Index (IQA); the additional objective is to feed the environmental management of the 47 monitored plants. The creation of the IQA was based on an opinion survey with specialists in water quality, which indicated the variables to be evaluated, the relative weight and condition of each parameter, according to a rating scale. Of the 35 water quality indicators initially proposed, only nine were selected (pH, BOD, thermotolerant coliforms, total nitrogen, total phosphorus, temperature, turbidity, total residue, dissolved oxygen). Variation curves were synthesized in a set of mean curves for each parameter, as well as their corresponding relative weight. The IQA is calculated by the weighted output of the water qualities corresponding to the variables that make up the index.</p>

W1.2h

(W1.2h) Provide total water withdrawal data by source.

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Fresh surface water, including rainwater, water from wetlands, rivers, and lakes	Relevant	136,163,853	Higher	<p>Total volume affluent to Cemig's mills in the year 2018. In 2017, the value was 97,132,810 megaliters / year.</p> <p>The value of 2018 was higher than that of 2017 due to the better hydrological conditions verified in 2018. The variation of this volume is related to the rainfall variability in the period.</p> <p>It is emphasized that the capture of this water does not imply consumption, since water is used to generate energy in hydroelectric dams. It is expected that the water intensity of the thermoelectric plant will remain constant, since there are no projects to make the plant more efficient.</p> <p>The company considers relevant all sources of water withdrawal it uses.</p>
Brackish surface water/Seawater	Not relevant			<p>Cemig does not use brackish water in its operations. Therefore, this source is not relevant to Cemig. Due to its efforts to diversify the energy matrix and reduce dependence on water resources, the Company does not expect this source to become relevant.</p>

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Groundwater – renewable	Relevant	49.84	Much lower	<p>The funding in 2017 was 130,211 megaliters / year. The much lower result in 2018 was due to a reduction in the number of power plants (117 in 2017 to 87 in 2018), as well as the reduction of administrative units provided by real estate sales in 2018, such as the sale of the Advanced Distribution Center (CDA) Montes Claros, located in Montes Claros ..</p> <p>The company considers relevant all sources of water withdrawal it uses.</p> <p>The increase in consumption of this source is not expected in the coming years.</p>
Groundwater – non-renewable	Not relevant			<p>Cemig does not use non-renewable groundwater in its operations. Therefore, this source is not relevant to the Company. Moreover, this source is not expected to become relevant.</p>
Produced/Entrained water	Not relevant			<p>Cemig does not produce water in its operations. Therefore, this source is not relevant to the Company. In addition, due to the nature of Cemig's business, this source is not expected to become relevant.</p>

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Third party sources	Relevant	175.69	Lower	<p>The Capture in 2017 was 209.67 megaliters / year. The reduction of outsourcing in 2018 is the result of measures such as change of processes, management of consumption at the facility and faster correction of leaks, and the installation of new equipment, which also reduces consumption. The outsourced source of Cemig is a state supplier - COPASA, Sanitation Company of the state of Minas Gerais.</p> <p>It is expected that the administrative consumption of water will decrease due to a reduction in the number of employees of the Company and also the reduction of administrative units (in 2019, it is planned to sell 44 properties located in municipalities of Minas Gerais)</p> <p>The company considers relevant all sources of water withdrawal.</p>

W1.2i

(W1.2i) Provide total water discharge data by destination.

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Fresh surface water	Relevant	131,583,163	Higher	<p>Total volume affluent to the Cemig mills in the year 2018. In 2017, the value was 101,657,085 megaliters / year. The value of 2018 was higher than that of 2017 due to the higher affluent volume in 2018. It is expected that the disposal by this source will not change in the coming years.</p> <p>The company considers relevant all sources of water withdrawal it uses.</p>
Brackish surface water/seawater	Not relevant			<p>Cemig does not discharge brackish water. Therefore, this source is not relevant to the Company nor is it expected that this source will become relevant.</p>
Groundwater	Relevant	32.82	Much lower	<p>Effluent generation estimates are made considering 80% of the withdrawal / abstraction value of the administrative area. In 2017 the value was 104.17 megaliters.</p> <p>The company considers relevant all the water discharge destinations it uses. It is not expected to increase the discharge of this source in the coming years. This variation is related to the decrease in the number of plants (117 in 2017 to 87 in 2018), as well as the reduction of administrative units provided by the sale of Advanced Distribution Centers located in the municipalities of Montes Claros and Governador Valadares.</p>

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Third-party destinations	Relevant	140.55	Lower	<p>Effluent generation estimates are made considering 80% of the water withdrawal / abstraction value of the administrative area, with 167.74 in 2017. Effluents generated in administrative units are disposed of in public sewage systems, or in controlled septic tanks, and do not directly affect any body of water. This value represents the sum of the use of groundwater and public supply.</p> <p>The company considers relevant all the water discharge destinations it uses. The discharge is expected to decrease due to the downward trend in the number of Company employees.</p>

W1.2j

(W1.2j) What proportion of your total water use do you recycle or reuse?

	% recycled and reused	Comparison with previous reporting year	Please explain
R o w 1	None	About the same	Most of Cemig's energy generation has non-consumptive water use. There is low consumption in its operations, only in its thermoelectric plants and administrative activities, and the rate of recirculation of water is considered insignificant in these operations.

W-EU1.3

(W-EU1.3) Do you calculate water intensity for your electricity generation activities?

Yes

W-EU1.3a

(W-EU1.3a) Provide the following intensity information associated with your electricity generation activities.

Water intensity value (m3)	Numerator: water aspect	Denominator: unit of production	Comparison with previous reporting year	Please explain
0.9	Freshwater consumption	MWh	Higher	<p>Cemig operates in the generation, transmission and distribution businesses, in which the latter two do not use water in the production process. In relation to the generation business, Cemig's generating plant is predominantly composed of hydroelectric plants, with only one thermal plant that consumes water, even though it is only dispatched to meet the electrical sector's contingencies. Thus, the calculations are relative to your thermal plant. The variation was due to the increase in the number of plant drives compared to 2017. The water intensity increases when the plant does not operate continuously.</p> <p>It is expected that the water intensity of the thermoelectric plant will remain constant, since there are no projects to make the plant more efficient. Thus, the variation of the indicator is caused by the extension of operation of the thermoelectric plant during the year or by any leaks.</p>

W2. Business impacts

W2.1

(W2.1) Has your organization experienced any detrimental water-related impacts?

Yes

W2.1a

(W2.1a) Describe the water-related detrimental impacts experienced by your organization, your response, and total financial impact.

Country/Region

Brazil

River basin

Rio Doce

Type of impact driver

Physical

Primary impact driver

Declining water quality

Primary impact

Reduction or disruption in production capacity

Description of impact

On November 5, 2015, the dam broke the Fundão mineral waste from Samarco Mineração SA, located in Mariana, Minas Gerais, located in a headwaters region of the Doce river basin, which resulted in an environmental disaster of magnitude and repercussion. The rupture of the dam released an estimated volume of 34 m³ of mineral waste, water, and materials used in its construction, causing several socio-economic and

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environmental impacts in the Rio Doce Basin. At the time of the dam breaking of Fundão, there was a paralysis of power generation in the Candonga, Baguari, and Aimorés hydroelectric dams, in which Cemig holds a stake. Since then, the Cemig Group has monitored solid standstills, as well as evaluating safety issues, especially from the Candonga Power Plant which has received most of the sediment. In terms of the physical guarantee, Usina Candonga represents less than 1% of the Cemig Group.

Primary response

Other, please specify

Infrastructure maintenance

Total financial impact

0

Description of response

Cemig has a corporate interest in the company Aliança Energia, a member of the Candonga Hydroelectric Power Plant, in a proportion of 45%, resulting in a 22.5% stake in this plant. This plant suffered an incident in November 2015 concerning the disruption of the tailings dam of Samarco Mineração SA, belonging to Vale and BHP Billinton, located in Mariana, Minas Gerais.

Since then, the Candonga reservoir is undergoing maintenance, funded by Samarco, in order to return this plant to the operation. In order to honor the energy sales contracts signed prior to the incident, Aliança Energia acquired in the free energy market all the necessary amount, which generated in the first moment a negative result. Considering that the incident occurred was the responsibility of a third party, the Energy Alliance filed a request in court for the National Electricity Agency (ANEEL) to maintain the commercial operation of the plant and its permanence in the Energy Realignment Mechanism (MRE), including retroactive to the date of the incident. In April 2017, the Candonga Hydroelectric Power Plant was awarded in court, by means of an injunction, guaranteeing the permanence of the plant in the MRE, retroactive to the date of the incident. Thus, it cannot be said that the incident suffered by the Candonga HPP in 2015 caused Cemig financial losses.

W2.2

(W2.2) In the reporting year, was your organization subject to any fines, enforcement orders, and/or other penalties for water-related regulatory violations?

No

W3. Procedures

W-EU3.1

(W-EU3.1) How does your organization identify and classify potential water pollutants associated with your business activities in the electric utilities sector that could have a detrimental impact on water ecosystems or human health?

In accordance with the guidelines of the Company's Biodiversity Policy, which are supposed to create more efficient strategies for biodiversity conservation and meet state and federal resolutions, Cemig performs Water Quality Monitoring. This monitoring acts as an essential tool in the identification and collection of information for assessment and control of environmental impacts on aquatic ecosystems in all phases of their projects - from project design to operation. The water quality of Cemig reservoirs is monitored regularly in a network that includes 47 reservoirs and more than 200 physical, chemical and biological data collection stations in the main hydrographic basins of Minas Gerais.

The collections for the monitoring of the water quality generate volume of information that is analyzed and stored, forming an extensive database, named Siságua. Siságua allows the analysis of the temporal and spatial evolution of reservoirs and their surroundings, and its improvement provides a differentiated management structure. With rapid, accurate and useful information generation, the system corroborates for a more efficient management of the water reservoirs.

In order to evaluate the condition of degradation of water resources, water quality indexes are applied, which aim to simplify, quantify, analyze, synthesize and communicate data generated in monitoring.

With the purpose of translating and facilitating communication with the lay public, Cemig uses and makes available, through the Sistema Siságua, the Water Quality Index (IQA); the additional objective is to feed the environmental management of the 47 monitored plants. The creation of the IQA was based on an opinion survey with specialists in water quality, which indicated the variables to be evaluated, the relative weight and condition of each parameter, according to a rating scale. Of the 35 water quality indicators initially proposed, only nine were selected (pH, BOD, thermotolerant coliforms, total nitrogen, total phosphorus, temperature, turbidity, total residue, dissolved oxygen). Variation curves were synthesized in a set of mean curves for each parameter, as well as their corresponding relative weight. The IQA is calculated by the weighted output of the water qualities corresponding to the variables that make up the index.

Cemig promotes information campaigns on aspects that may interfere with water quality and energy generation, such as gold mussel, cyanobacteria, aquatic macrophytes, reservoir silting, iron-bacteria, among others. One of the most relevant cases that presents health risks to the population is the occurrence of cyanobacteria in water bodies because of the ability of these organisms to produce toxins. In relation to macrophytes, Cemig has monitoring programs in reservoirs impacted by eutrophication in order to evaluate the need to remove these plants and minimize their impacts on generation. In hydroelectric reservoirs, the uncontrolled growth of macrophytes causes problems in the turbines, causing frequent discharges through the spillways to the exit of the

plants, generating waste of water and decrease of the electrical production. For all this, these plants need to be controlled or removed from many aquatic environments, but as long as eutrophication of the body of water is not controlled the problem will reoccur.

W-EU3.1a

(W-EU3.1a) Describe how your organization minimizes the adverse impacts of potential water pollutants associated with your activities in the electric utilities sector on water ecosystems or human health.

Potential water pollutant	Description of water pollutant and potential impacts	Management procedures	Please explain
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<p>Hydrocarbons</p>	<p>In substations of the transmission and distribution system of energy there are equipment that contain insulating oil inside. Any leakage of this oil may contaminate water bodies.</p>	<p>Compliance with effluent quality standards Measures to prevent spillage, leaching, and leakages Community/stakeholder engagement Emergency preparedness Other, please specify</p> <ul style="list-style-type: none"> • Oil regeneration and reuse 	<p>Cemig has in many of its substation's equipment called water and oil separator that aims to contain the oil in case of leaks. These boxes are monitored to verify compliance with environmental legislation. In addition, there are emergency response plans in the company.</p> <p>Regarding the Igarapé TPP, part of its effluent is classified as an industrial effluent. In this project there is an internal effluent treatment process, which performs pH adjustment, removal of suspended solids and oils and greases - before being released into the receiving body. The water quality of the receiving body - Rio Paraopeba - downstream of the launch is monitored to ensure compliance with legislation. In 2018, the volume of effluent released by Ugar Igarapé was 4,321.42 m3.</p> <p>It is important to highlight that the main risk of negative impact due to the emission of effluents from Cemig is the presence of oil in the waters of the UHEs. Any type of incident relating to contamination or leakage is recorded and consolidated in an Environmental Occurrence Report (ROA). In 2018, there were two episodes recorded.</p> <p>In both cases it was possible to remedy the leakage and the oil did not come into contact with soil or liquid surface, not setting a contamination. In addition, all contaminated solid waste was disposed of and disposed of as required by legislation.</p> <p>No body of water was significantly affected by discards or water drainage resulting from Cemig operations in 2018 and the magnitude of that impact, if it occurs, may be high.</p> <p>The success of this action is measured by the number of occurrences, and in the case of 2018, it was 0.</p>
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W3.3

(W3.3) Does your organization undertake a water-related risk assessment?

Yes, water-related risks are assessed

W3.3a

(W3.3a) Select the options that best describe your procedures for identifying and assessing water-related risks.

Direct operations

Coverage

Full

Risk assessment procedure

Water risks are assessed as part of an enterprise risk management framework

Frequency of assessment

Six-monthly or more frequently

How far into the future are risks considered?

>6 years

Type of tools and methods used

Tools on the market

Enterprise Risk Management

Tools and methods used

Global Water Tool for Power Utilities

COSO Enterprise Risk Management Framework

ISO 31000 Risk Management Standard

Companhia Energetica Minas Gerais - CEMIG CDP Water Security Questionnaire 2019 Tuesday, August 6, 2019
Other, please specify

The SAP RM (Risk Management) software

Comment

Cemig has a risk management policy that guides not only the companies Cemig D and Cemig GT, but also all the wholly-owned subsidiaries, and is approved by the Board of Directors. It also has risk management software, SAP RM (Risk Management), which enables the process of risk mapping to be done continuously, as information updates, checks and evaluations of controls and plans are informed by the owners of each activity within the system.

Supply chain

Coverage

Partial

Risk assessment procedure

Water risks are assessed as part of an enterprise risk management framework

Frequency of assessment

Six-monthly or more frequently

How far into the future are risks considered?

>6 years

Type of tools and methods used

Enterprise Risk Management

Other

Tools and methods used

COSO Enterprise Risk Management Framework

ISO 31000 Risk Management Standard

Other, please specify

The SAP RM (Risk Management) software

Comment

Cemig conducts inspections and audits in its supply chain. These audits are performed based on prioritization criteria to identify the most critical suppliers.

Other stages of the value chain

Coverage

Partial

Risk assessment procedure

Water risks are assessed as part of an enterprise risk management framework

Frequency of assessment

Six-monthly or more frequently

How far into the future are risks considered?

>6 years

Type of tools and methods used

Tools on the market

Enterprise Risk Management

Tools and methods used

COSO Enterprise Risk Management Framework

ISO 31000 Risk Management Standard

Other, please specify

The SAP RM (Risk Management) software

Comment

In the scenarios analyzed, the company evaluates the impacts resulting from regulatory changes and price structure that may impact the operation of its ventures. Cemig participates in the Water Resources Councils and Basin Committees, Technical Chambers, Working Groups and works with the Sector Associations, following the regulatory and tariff scenario, and contributes to the decision making regarding the regulation of water uses in the basins and their respective impacts.

W3.3b

(W3.3b) Which of the following contextual issues are considered in your organization's water-related risk assessments?

	Relevance & inclusion	Please explain
Water availability at a basin/catchment level	Relevant, always included	Cemig, aware of the importance of water resources for the maintenance of its businesses and for society, established its Water Resources Policy, which defined the principles that guide the Company's actions in relation to the subject. In developing its activities, the Company undertakes to adopt practices for the rational, integrated and sustainable use of water resources, for prevention and defense against critical hydrological events, both of natural origin and the inadequate use of natural resources, taking into account the needs of the current and future generations and water availability. In addition, Cemig has an area dedicated to the management of water resources, which through planning adopts operational measures in its hydroelectric plants that aim to calculate the optimal generation of each plant, ensuring the best use of water for this generation without impacting other uses of the river basin. For each hydroelectric plant there is the Operational Instruction, which defines its technical and operational parameters. In order to minimize the risk associated with the water quality of its reservoirs, Cemig regularly monitors a network that includes the main hydrographic basins of the State of Minas Gerais in more than 200 data collection points that monitor, in addition to the established physical and chemical parameters in Brazilian legislation, biological groups such as phytoplankton, zooplankton and zoobentos. All the data generated are stored in the database - SISÁGUA, which integrates the database of the Mining Institute of Water Management (IGAM).

	Relevance & inclusion	Please explain
Water quality at a basin/catchment level	Relevant, always included	<p>Cemig operates a hydrometeorological network with 583 monitoring points, 232 of rainfall, 224 of flows in waterways, 74 of monitoring levels of reservoirs and rivers, and 53 weather stations that monitor rains, temperature, humidity The water quality of Cemig reservoirs is regularly monitored in a network that includes the main hydrographic basins of Minas Gerais, in 42 reservoirs and more than 180 collection stations physical, chemical and biological data such as phytoplankton, zooplankton and zoobenthos.</p> <p>In addition, sediment monitoring is performed at 86 stations located in its hydroelectric plants, where water samples are collected and analyzed in an accredited laboratory.</p> <p>This monitoring is relevant because it allows us to analyze trends and estimate the frequency of events that may impact Cemig's operations and to specify measures necessary for its mitigation.</p> <p>Cemig uses as a tool to monitor water quality the Cemig System for Monitoring and Quality Control of Reservoir Water - SISÁGUA, which allows a spatial and temporal evaluation, in an adequate and uniform way, so that the data obtained can be used by the company, in all units and also by partners. Monitoring is the measurement or verification of water quality and quantity parameters. Continuous or periodic monitoring of the condition and control of water body quality is carried out in accordance with the CONAMA Resolution No. 357 of 2005 and CONAMA Resolution No. 274 of 2000, which establishes levels for bathing, in order to ensure the necessary conditions for the recreation of primary contact, such as swimming, water skiing and diving. At the state level, the COPAM-CERH-MG Joint Legislative Deliberation no. 1/2008 should also be observed.</p>

	Relevance & inclusion	Please explain
Stakeholder conflicts concerning water resources at a basin/catchment level	Relevant, always included	<p>Cemig considers this aspect to be relevant, since 96% of its energy matrix comes from a hydropower source (83 hydroelectric plants: 21 UHEs and 62 PCHs),</p> <p>Therefore, Cemig monitors and monitors conflicts with stakeholders through its active participation in the Water Resources Councils, Basin Committees, Technical Chambers and Working Groups, in which there is participation of several river basin users and other parties concerned. Conflicts over the priority of use and impacts caused in river basins are discussed and deliberated in such forums with the participation of water resource management bodies. Cemig has participated in 5 river basin committees of federal rivers and 20 river basin committees of state rivers. The company also monitors the news disseminated in the various communication channels, as well as receives demands during periods of flood or drought and acts to resolve any conflicts with communities located in hydrographic basins where it has hydroelectric projects. Cemig implements the Proximity Program, certified in ISO 9001, which is committed to working with key stakeholders such as government, civil defense, fire brigade, military police, water and environment management bodies, river basin committees, municipal authorities, community associations, class representatives, large users and various media, which allow the identification of conflicts related to water with other users and promote social development in the communities around the plants. Stakeholder engagement is carried out in river basins where potential conflicts are mapped.</p>

	Relevance & inclusion	Please explain
Implications of water on your key commodities/raw materials	Relevant, always included	<p>Cemig considers this aspect to be relevant, since 96% of its energy matrix comes from a hydropower source (83 hydroelectric plants: 21 UHEs and 62 PCHs),</p> <p>In this context, water is Cemig's main raw material. Cemig monitors in real time the amount of water available in the rivers and in its plants, through 262 stations of telemetry belonging to the Monitoring System and Hydrometeorological Telemetry (STH). It also monitors and monitors the risks related to water quality in its reservoirs through a network of 583 monitoring points in 200 stations. This monitoring allows analyzing trends and estimating the frequency of events that may impact Cemig's operations, as well as specifying the measures necessary for its mitigation, providing feedback to risk management tools. The tool used is SISAGUA.</p>
Water-related regulatory frameworks	Relevant, always included	<p>Cemig considers this aspect to be relevant, since 96% of its energy matrix comes from a hydropower source (83 hydroelectric plants: 21 UHEs and 62 PCHs),</p> <p>Therefore, Cemig actively participates in all deliberative and regulatory forums for water resources, both at the federal and state levels, acting in the elaboration of policies and guidelines and, at the same time, monitoring regulatory trends, being an important subsidy for the elaboration of estimates of impacts on the Company's ventures at the local level.</p> <p>Estimates of potential regulatory changes include changes in the rules on granting concessions, financial compensation, collection mechanisms, and price structure.</p> <p>Charges for large hydroelectric plants are already regulated and there is no forecast of regulatory changes in the short and medium term, and for Small Hydroelectric Plants, charging for the use of water is considered exempt under current legislation. For the use of raw water in administrative areas and for thermoelectric generation, the various Watershed Committees are implementing their respective collection mechanisms.</p> <p>The tool used to monitor regulatory aspects is CONDOR - an internal system of regulatory monitoring.</p>

	Relevance & inclusion	Please explain
Status of ecosystems and habitats	Relevant, always included	Cemig monitors the presence of invasive species such as mollusc golden mussel, which can lead to fouling in pipes, pumps and equipment. The monitoring tool is the Cemig System for Monitoring and Quality Control of Reservoir Water - SISAGUA.
Access to fully-functioning, safely managed WASH services for all employees	Relevant, always included	All Cemig employees are served by water, sanitation and hygiene services. In all facilities, water potability control is carried out for human consumption in accordance with Ministry of Health Ordinance No. 05 of 09/28/2017.
Other contextual issues, please specify	Not considered	

W3.3c

(W3.3c) Which of the following stakeholders are considered in your organization's water-related risk assessments?

	Relevance & inclusion	Please explain
Customers	Relevant, always included	<p>In a scenario of unfavorable hydrology, it causes the hydroelectric generation in Brazil to be reduced and, therefore, companies cannot meet 100% of the volume planned in the contracts (physical guarantee). Thus, the National System Operator (ONS) is required to dispatch thermal plants to meet part of the national demand. The greater the water deficit, the greater the chances that the Company will have to buy energy in the short-term market to meet the requirements of the contracts. The impact of this materialization of risk for this interested party will depend on the marketing strategy and the risk management strategy adopted by Cemig. Thus, because they are directly impacted by the materialization of risk, customer engagement is important. To engage its customers, Cemig performs the Energy Efficiency Program to disseminate the concept of conscious use of electric energy, as well as advertising campaigns with energy-saving tips. This engagement is continuous and covers the entire concession area of the company.</p>
Employees	Relevant, always included	<p>In 2018, the total volume of water used for administrative purposes at Cemig was 241,117 m³. This volume represents 90% of the total water consumed by the Company, which demonstrates the relevance of its employees for water risk assessments.</p> <p>The use of water for administrative purposes showed a reduction of 28% compared to the year 2017. This is the result of measures such as change of processes, management of water consumption, faster correction of leaks and installation of aerating nozzles in taps of bathrooms.</p> <p>As a way of engaging its employees, in 2017, Cemig promoted the Illuminated Idea Contest that aimed to promote solutions aimed at reducing fuel consumption, energy efficiency, water efficiency and reduction in waste generation. Of the 44 projects registered by Cemig employees, the first to be implemented was a rainwater harvesting system for consumption in the main building of the Company in the Vila Mariana neighborhood, in Governador Valadares. The project was inaugurated in December 2018 and its results were disclosed in internal publication as a form of recognition of the work done.</p>

	Relevance & inclusion	Please explain
Investors	Relevant, always included	<p>The higher the water deficit, the greater the cost for Brazilian companies. Being strongly dependent on the water source in its generation deficits in its generation will impact the Company's results and, consequently, the interest of investors. That is why it is important to engage them in risk assessments. The impact of the materialization of this risk on this interested party will depend on the strategy of energy commercialization and risk management adopted by Cemig.</p> <p>As a form of engagement with investors, Cemig holds meetings and conferences in which it presents the storage level of the reservoirs.</p>
Local communities	Relevant, always included	<p>For the operation of the reservoirs, Cemig has mapped the main agents of the communities upstream and downstream of the plants, always proactively informing about severe flood and drought situations. These situations directly affect communities and, therefore, it is important to engage them in water risk assessments. The Proximity Program was created with the objective of strengthening the ties between communities, the Company and local Civil Defense teams. Therefore, the form of engagement with the communities is through the Proximity Program which, in 2018, held 29 Work Meetings, with the theme "Preparation for PAE - Culture of Alertness and Emergency", attended by about 230 Civil Defense agents of 75 cities involved.</p>
NGOs	Relevant, always included	<p>Cemig always seeks to protect local communities as a whole. The direct channel between the NGOs and the Company is via Proximidade Program and Cemig's participation in the water resources forums, where such organizations play an important role in representing civil society. NGOs participate actively and strategically in the formulation of the laws and regulations of the National Water Resources Policy and the National Water Resources Management System. NGOs also participate in the technical discussions among the main collegiate bodies that formulate rules and establish guidelines, such as the National Council of Water Resources (PNRS), the State Council of Water Resources (CNRS), the Federal and State Basin Committees, Technical Chambers and working groups, especially those dealing with the development of strategic plans for water resources and the regulation of concessions and charging for water use.</p> <p>Therefore, the form of engagement with NGOs is through the Proximity Program that in 2018 held 29 Work Meetings.</p>

	Relevance & inclusion	Please explain
Other water users at a basin/catchment level	Relevant, always included	<p>The use of water for electric energy generation is subject to the regulatory environment, and the hydroelectric matrix of the National Interconnected System (SIN) is the responsibility of the National Electric System Operator (ONS).</p> <p>Consideration must be given to the multiple uses of water by other users of the river basin, in the operation and management of the reservoirs that Cemig uses for energy generation, which implies multiple environmental and safety restrictions.</p> <p>In periods of severe drought, such as occurred in the period from 2013 to 2018, the monitoring and forecasting of reservoir levels, as well as the constant engagement with the public power, civil society and users, were paramount to guarantee the generation of energy with maintenance of other uses of water.</p> <p>The engagement is carried out through the Proximity Program (28 events in 2018) where company specialists inform the operational conditions of the reservoirs and through participations in the river basin committees. As a reference for engagement with users, we can mention the management of the Três Marias HPP reservoir (396 MW), which in 2011-2018 was restricted due to the low rainfall index. The management policy adopted by Cemig, National Electric System Operator (ONS) and the National Water Agency (ANA) ensured the viability of the Jaíba Irrigation Project (a grain and vegetable producer in the São Francisco River basin).</p> <p>All decisions to meet this important project are defined by a committee led by ANA, with the participation of ONS, Cemig, Chesf and the Basin Committee, among several other institutions, during meetings held every two weeks.</p>

	Relevance & inclusion	Please explain
Regulators	Relevant, always included	Cemig participates in the National Water Resources Council, State Council for Water Resources-MG, River Basin Committees, Technical Chambers and Working Groups, Class Associations (Abrage), public hearings, where the Basin Management Plans are discussed, drafted and approved Hydrographic, resolutions, bills, normative deliberations and the regulation of granting and charging for the use of water resources. In these environments, the expertise of its experts is used to act in the elaboration of policies and guidelines regarding the regulation of water uses in the basins. These policies and guidelines are established by regulatory agencies and have a direct impact on Cemig's business, which makes it important to engage with this interested party. The method of engagement consists of holding meetings, presenting technical information on reservoir management.
River basin management authorities	Relevant, always included	Cemig participates in the Water Resources and Watershed Committees, Technical Councils, Working Groups and works with Sector Associations (ABRAGE, APINE and ABRAGEL), which provide full monitoring of the regulatory and tariff scenario, which justifies the importance of engaging these interested parts. In these environments, the Company establishes a dialogue with these local agents, setting out the expected scenarios and evaluating the possible impacts that changes in the occupation and use of water resources can cause in the Company's activities. The method of engagement consists of holding meetings, presenting technical information on reservoir management.
Statutory special interest groups at a local level	Relevant, always included	Cemig participates in the Water Resources and Watershed Committees, Technical Councils, Working Groups and works with Sector Associations (ABRAGE, APINE and ABRAGEL), which provide full monitoring of the regulatory and tariff scenario, which justifies the importance of engaging In these environments, the Company establishes a dialogue with these local agents, setting out the expected scenarios and evaluating the possible impacts that changes in the occupation and use of water resources can cause in the Company's activities. The method of engagement consists of holding meetings with technical information on the management of the reservoirs.

	Relevance & inclusion	Please explain
Suppliers	Relevant, always included	The Company performs the geographical mapping of its critical suppliers, identifying if they are located in areas under water stress. As a result, all these suppliers are located in Brazil, therefore they are not exposed to water stress. In addition, Cemig performs audits on its suppliers' critics where it can identify non-conformities in relation to the use of the water resource. These nonconformities impact Cemig due to its co-responsibility for the impacts of its supply chain. Therefore, it is important to engage suppliers. The method of engagement occurs through face-to-face audits at supplier sites.
Water utilities at a local level	Relevant, always included	Cemig maintains an output control tool for all Company units, to continually monitor the validity of certificates aiming the continuity of water supply for local activities. Due to the high relevance of the potential impact of discontinuity, it is important to engage local supplying water companies in this process. The method of engagement is to hold meetings, with presentations of present technical information, and techniques on reservoir management.
Other stakeholder, please specify		

W3.3d

(W3.3d) Describe your organization's process for identifying, assessing, and responding to water-related risks within your direct operations and other stages of your value chain.

Corporate risk management is an integral process of Cemig's Corporate Governance practices, whose relevant activity is the mapping of events that may interfere with the achievement of the Company's strategic objectives, the so-called Top Risks. The modeling and analysis of risk management operations aim at optimizing investments in controlling activities, reducing costs and losses, improving performance and, consequently, favoring the achievement of the Company's goals. Eventually, opportunities are identified and developed in accordance with the Company's interests.

When a risk is mapped for the first time in Cemig, the Company's corporate methodology guides the following steps: identification - that corresponds to understanding the scope, causes and impacts of the risk; quantification - where the probability of occurrence is estimated, and the possible impacts, if that risk materializes; treatment - which is 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 monitoring - which is to insert risk into the corporate tool, manage self-assessments of controls and mitigation initiatives, and validate risk with its owner. When there is a need to review a risk that has already been mapped, all information is updated via the system. With the risk mapping, a report containing the main information about that risk, the Risk Report, will be generated if it is a Top Risk.

The areas certified in ISO 9001, 14001 and OHSAS 18001 carry out risk analysis based on the guidelines of ISO 31000 Risk Management Standard.

The Committee of Sponsoring Organizations of the Treadway Commission - COSO, a world reference in the theme, stresses the importance of considering corporate risks in both strategy definition and follow-up. This approach to risk with strategy allows the organization to anticipate and understand that changes can go beyond the generation of potential crises, also creating opportunities.

The Company has risk management software, SAP RM (Risk Management), which enables the process of risk mapping to be done continuously, as information updates, checks and evaluations of controls and plans are informed by the owners of each activity within the system.

In 2018, the Top Risks mapping was guided by themes prioritized by the Corporate Risk Monitoring Committee (CMRC) and validated by the Board of Directors and Board of Directors, covering the Holding, Distribution, Generation, Transmission and Marketing business and registered in SAP RM. Among the risks mapped are also those of socio-environmental nature, linked to climate change. The report of the Top Risks to the Board of Directors and to the Board of Directors, as well as the CMRC's treatment recommendations for each case, are made continuously and strictly according to the flow approved by the Committee.

The Company's current risk management policy is a public document that guides not only the companies Cemig D and Cemig GT, but also all the wholly-owned subsidiaries, and is approved by the Board of Directors. This policy also explains the risk appetite to be followed, is guided by principles that translate best market practices and, in particular, is aligned with the "Three Lines of Defense" governance model.

The "Three Lines of Defense" model is a simple and effective way to improve communication of risk management and internal controls by clarifying key roles and responsibilities, helping to ensure the continued success of risk management initiatives.

W4. Risks and opportunities

W4.1

(W4.1) Have you identified any inherent water-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes, both in direct operations and the rest of our value chain

W4.1a

(W4.1a) How does your organization define substantive financial or strategic impact on your business?

The company defines the strategic risks as those related to the objectives and vision of the Company, or to strategic decisions that risk not achieving the planned success. With regard to the significant financial impact, are those that may have a significant adverse effect on business, affecting the financial condition and results of operations. Cemig considers as a measure of substantial financial impact of water risks if there is a loss in the Company's net operating revenue above 1%. This metric is valid throughout the Company. 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 each of the points for each of the scales. Based on these scales, Cemig prioritizes each risk, which allows the hierarchy of risks within a risk / opportunity exposure matrix containing the risks / opportunities raised throughout the process. In addition, information on the financial implications of risks / opportunities, their controls and their measures, is fed specifically to the variable "financial impacts" mentioned above, used to define the risk / opportunity position in the exposure matrix. Considering this, the system calculates the cost / income of the inherent risk / opportunity (ie, no management actions), the residual risk / opportunity (after implementation of controls) and the planned residual risk / opportunity (after implementation of measures). This enables prioritized decision making based on robust financial analyzes of the scenarios with and without risk / opportunity management. As an example of a financial impact in 2018, a combination of negative factors affected the distribution companies' purchases, including (i) an adverse period in terms of rainfall, resulting in high spot prices from May to October; and (ii) seasonality of the physical guarantee of the MRE, allocating a large volume of energy in the second half of 2018, resulting in very low MRE adjustment factors between June and October. In the second half of 2018, these factors significantly increased distributors' expenditures on energy purchases. The balance of the tariff bill registered a deficit of more than R \$ 3.5 billion and, as a result, the current tariff-rate mechanism was not sufficient to cover the mismatch in the cash flow of the distributors in 2018. These values

should be recomposed in the next tariff review.

W4.1b

(W4.1b) What is the total number of facilities exposed to water risks with the potential to have a substantive financial or strategic impact on your business, and what proportion of your company-wide facilities does this represent?

	Total number of facilities exposed to water risk	% company-wide facilities this represents	Comment
R o w 1	1	1-25	A hydroelectric project, in order to guarantee its long-term electric energy production, and thus preserve its business plan, has a flow of right to use water resources. This flow is part of the Hydrographic Basin Water Resources Plan, which establishes for each type of river basin user the percentage of the flow destined for each use. Recently, the water catchment area of the Paranaíba River has been under great pressure by the users of irrigation in order to increase more and more the flows of consumptive uses taken for irrigation. In this context, besides other hydroelectric plants located in the basin, there is the Emborcação HPP, belonging to Cemig. Each time the upstream consumptive uses are increased in the basin, downstream hydroelectric plants may suffer physical guarantee losses in periodic reviews, with a direct impact on their revenues. Just to give you an idea, estimates of the impact of Emborcação HPP on the next physical warranty review, expected to occur in the year 2022, are of the order of 2.0% of the plant's physical guarantee. This is only due to the increase in upstream consumptive uses.

W4.1c

(W4.1c) By river basin, what is the number and proportion of facilities exposed to water risks that could have a substantive impact on your business, and what is the potential business impact associated with those facilities?

Country/Region

Brazil

River basin

Other, please specify

Number of facilities exposed to water risk

1

% company-wide facilities this represents

1-25

% company's annual electricity generation that could be affected by these facilities

Less than 1%

% company's total global revenue that could be affected

Less than 1%

Comment

The estimated impact on the physical guarantee of Emborcação HPP, due to the increase of withdrawals for upstream irrigation, in the next revision of GF, is of the order of 10 MW. This amount corresponds to less than 1% of Cemig's physical guarantee.

W4.2

(W4.2) Provide details of identified risks in your direct operations with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.

Country/Region

Brazil

River basin

Other, please specify

All Basins that Cemig has Hidro Power

Type of risk

Physical

Primary risk driver

Severe weather events

Primary potential impact

Reduced revenues from lower sales/output

Company-specific description

Climate change can cause changes in seasonal rainfall patterns, with extreme rainfall events and more pronounced droughts, as well as changes in their geographic distribution. In addition, there may be a change in the average amount of precipitation by changing the amount of water that arrives. As Cemig's electricity production is basically hydraulic, these changes can cause a reduction in its generation capacity. The year 2018 was the 7th consecutive year with affluence below the average in the southeast region. This long drier series penalized reservoir storage, which reached only 44% of the maximum level at the end of the wet season of 2018 in the Southeast. In this scenario, the PLD reached its maximum value in July and August (R \$ 505.18 / MWh) and closed the year with an average value of R \$ 288.57 / MWh (3rd highest in the last 10 years), with 11 % below the average LDP of 2017. Another factor affected by the situation of the system was the Generation Scaling Factor (GSF), which expresses hydroelectric generation as a percentage of the outtake seasonal guarantees of a plant. The GSF (Generation Scaling Factor) was also impacted by hydrology and closed 2018 with an average value of 0.84 (4th lowest of the last 10 years) against 0.81 of 2017.

Timeframe

More than 6 years

Magnitude of potential impact

High

Likelihood

Likely

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

Potential financial impact figure - minimum (currency)**Potential financial impact figure - maximum (currency)****Explanation of financial impact**

In 2018, a combination of negative factors affected the distribution companies' purchases, including (i) an adverse period in terms of rainfall, resulting in high spot prices from May to October, and (ii) allocating a large volume of energy in the second half of 2018, resulting in very low MER adjustment factors between June and October.

In the second half of 2018, these factors significantly increased distributors' expenditures on energy purchases. The balance in the tariff account registered a deficit of more than R \$ 3.5 billion and as a result, the current tariff-rate mechanism was not sufficient to cover the mismatch in the cash flow of the distributors in 2018. These amounts should be restated in the next tariff review.

Primary response to risk

Use of risk transfer instruments

Description of response

The Company's management is constantly managing its energy purchase contracts to mitigate the risk of exposure to the short-term market (MCP). The Generation Scaling Factor (GSF), which relates hydraulic generation with the seasonal physical guarantee of the mills, in 2018 the average GSF of the system was 0.84, still impacted by the unfavorable hydrological conditions below the historical average and also by the low level of the reservoirs, which leads hydroelectric agents to a 16% The exposure caused by the GSF was mitigated throughout the year by risk management and renegotiation of the hydrological risk.

Cost of response

15,000,000

Explanation of cost of response

The current management cost is associated with the maintenance of the planning team, buying and selling electric power (70 people). These people act in this risk and in other processes related to the commercialization of energy. The cost is recurrent.

Country/Region

Brazil

River basin

Other, please specify

All Basins that Cemig has Hydro Power

Type of risk

Physical

Primary risk driver

Severe weather events

Primary potential impact

Reduced revenues from lower sales/output

Company-specific description

Undesirable impacts on reservoirs due to siltation, which could occur more quickly or (in an optimistic scenario) more slowly, depending on how the change in precipitation and hydrologic levels occur in each reservoir. Cemig monitors reservoir siltation in several ways, including mapping changes in the shape of reservoir beds due to sedimentary deposits; monitoring of reduction in the volume of reservoirs; reservoir life studies; and monitoring the sedimentation volume. The reservoirs that are in the most critical situation are: PCH Rio de Pedras (9.28 MW) and Salto Grande HPP (102 MW).

Timeframe

More than 6 years

Magnitude of potential impact

Medium

Likelihood

Unlikely

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

3,437,118.5

Potential financial impact figure - minimum (currency)

Potential financial impact figure - maximum (currency)

Explanation of financial impact

Less than 0.5% of Cemig GT's net operating revenue (R\$6.874.237.000,00). It occurs due to the reduction or disruption of the power generation capacity of the hydroelectric plants, caused by the accumulation of sediments in the reservoir.

Primary response to risk

Other, please specify

Monitor the sediment load being cast into the water body

Description of response

This risk is managed through a series of actions such as: mapping the alteration of the morphology of the reservoir bed as a function of sediment deposition; monitoring the decrease of the volume of the reservoirs; studies on the useful life of the reservoirs; and monitoring the sediment supply.

Cost of response

1,650,000

Explanation of cost of response

The costs are annual and are associated with the maintenance of equipment and meteorological teams, the maintenance of the telemetry and hydro-meteorological monitoring system (STH), with sediment monitoring services in 86 stations located in hydroelectric plants.

Country/Region

Brazil

River basin

Other, please specify

All Basins that Cemig has Hydro Power

Type of risk

Regulatory

Primary risk driver

Regulatory uncertainty

Primary potential impact

Increased operating costs

Company-specific description

Charges for large hydroelectric plants are already regulated and there is no forecast of regulatory changes in the short- and medium-term, and for Small Hydroelectric Plants, use of water pricing is considered exempt under current legislation. In case of regulatory changes, water charges may be charged to plants with an installed capacity of less than 30MW (PCHs). In all, Cemig has 62 PCHs, corresponding to 12% of the company's installed capacity (705.96 MW)

For the use of raw water in administrative areas and for thermoelectric generation, the various Watershed Committees are implementing their respective collection mechanisms.

Timeframe

More than 6 years

Magnitude of potential impact

Low

Likelihood

Unlikely

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

2,145,833

Potential financial impact figure - minimum (currency)

Potential financial impact figure - maximum (currency)

Explanation of financial impact

The financial impact refers to the estimated collection of the fee for Small Hydroelectric Plants (SHPs). For large hydroelectric plants, this value is calculated through the following equation (7.00% x energy generated in MWh x TAR).

The Annual Reference Tariff (TAR) in 2018 was R \$ 74.03, a variation of 2.53% and for 2019, the value of the TAR is R \$ 77.38 / MWh.

Primary response to risk

Engage with regulators/policymakers

Description of response

Cemig's actions to manage the risks of regulatory changes are made through participation in the National Council of Water Resources, State Council of Water Resources-MG, River Basin Committees, Technical Chambers and Working Groups, Class Associations (Abrage), public audiences, where the Hydrographic Basin Management Plans, the resolutions, bills, normative deliberations and the regulation of granting and charging for the use of water resources are discussed, drafted and approved. In these environments, the expertise of its experts is employed in the elaboration of policies and guidelines regarding the regulation of water use in the basins.

At the same time, the company has a superintendence of institutional relationship and sectoral regulation that monitors regulatory changes and activates the water resources management team whenever the theme is adherent.

Estimates of potential regulatory changes include changes in the rules on granting concessions, financial compensation, collection mechanisms, and price structure.

Cost of response

364,000

Explanation of cost of response

The costs to manage the risk of regulatory changes are associated with the maintenance of the water resources management team, the institutional relationship and the sector regulation team.

W4.2a

(W4.2a) Provide details of risks identified within your value chain (beyond direct operations) with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.

Country/Region

Brazil

River basin

Other, please specify

All Basins that Cemig has Hydro Power

Stage of value chain

Use phase

Type of risk

Reputation & markets

Primary risk driver

Changes in consumer behavior

Primary potential impact

Reduced revenues from lower sales/output

Company-specific description

Continued increases in energy prices due to unfavorable hydrological scenarios associated with the country's adverse economic scenario increase the risk of consumer default or energy theft. The losses from delinquency directly impact the cash of Cemig D, since the company must

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pay, regardless of whether or not it receives payment from final consumers: the invoice of the energy supplied by the generators; the transmission service; the electric sector charges and the Pis/Cofins and ICMS taxes levied on energy.

Timeframe

Current - up to 1 year

Magnitude of potential financial impact

Medium-high

Likelihood

Virtually certain

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

264,000,000

Potential financial impact figure - minimum (currency)

Potential financial impact figure - maximum (currency)

Explanation of financial impact

The financial impact is related to the loss of revenue and consequent pressure on the distributor's cash flow due to the risk of not covering the maintenance and operation costs of the system. The financial impact refers to 2018 and refers to losses with delinquency. The amount is disclosed in the Management Report of Cemig D, on page 7 at the link: <http://cemig.infoinvest.com.br/ptb/17356/Cemig%20D%20T18.pdf>

Primary response to risk

Other, please specify
Engagement with Consumers

Description of response

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In order to mitigate this risk, the Company uses various communication and collection tools to avoid increasing delinquency, among them, telephone contacts, sending an email, SMS messages, billing warning letters, negatives of defaulting customers in credit protection and judicial collection companies.

Therefore, in order to reduce the number of debtors, in November the Company launched the Debt Negotiation Campaign with differentiated conditions for payment and installment payment. The action has a Call Center (0800) specific for the customer that opts for remote negotiation. In the city of Belo Horizonte, exclusive face-to-face service structure was made available.

Cost of response

14,842,380

Explanation of cost of response

Costs involve measures to reduce commercial losses. In 2018, 185 thousand inspections were carried out throughout the state of Minas Gerais, representing an increase of 85% from 2017 (99 thousand inspections). These inspections led to an increase of R \$ 59 million in Cemig's revenue, in addition to having recovered R \$ 18 million. Also, SGC / SAP / SAS / MECE inspection targeting software is used.

W4.3

(W4.3) Have you identified any water-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes, we have identified opportunities, and some/all are being realized

W4.3a

(W4.3a) Provide details of opportunities currently being realized that could have a substantive financial or strategic impact on your business.

Type of opportunity

Markets

Primary water-related opportunity

Development in communities close to hydroelectric power plants

Company-specific description & strategy to realize opportunity

In the quest to promote a closer relationship and foster social development in communities close to hydroelectric power plants, in addition to making the initial preparation for the Emergency Action Plan (PAE), publicizing Cemig's environmental actions conducted in dam's reservoirs, Cemig carries out the Proximity Program. In this Program, meetings are held where specialists give objective lectures to clarify operational aspects. Other issues such as dam safety and safe coexistence with the electric system are among the topics addressed. In 2018, 29 Work Meetings were held, with the theme "Preparation for PAE - Culture of Alertness and Emergency", where about 230 Civil Defense agents from 75 cities were involved. By 2019, the plan is to hold around 40 meetings, involving about 500 agents of the Municipal Coordination of Protection and Civil Defense - COMPDEC.

Estimated timeframe for realization

Current - up to 1 year

Magnitude of potential financial impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

16,777.11

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact

The financial impact was estimated by calculating the spontaneous media (favorable news) of Programa Proximidade (Proximity Program) through the dissemination of the Program in newspapers, websites, radio, TV and other media.

Type of opportunity

Products and services

Primary water-related opportunity

Sales of new products/services

Company-specific description & strategy to realize opportunity

The main opportunity is related to the development of new business related to distributed generation. The company intends to provide new energy service to its customers through distributed generation using mainly solar and wind sources. With this strategy, Cemig reduces its risk of exposure related to energy purchase oscillations due to adverse hydrological scenarios and earns revenue with the new portfolio of distributed generation service. To fulfill this strategy, Cemig Geração Distribuída S.A. - Cemig GD was created in 2018, from a new subsidiary of the Company.

During the year 2018, investments were approved in photovoltaic solar power plants (UFVs). Cemig GD entered into a partnership with Grupo Mori Energia Solar to develop and deploy the UFV solar power plant at Janaúba, with a capacity of 5MW, with an investment of R \$ 18.5 million. The return on investment is of the order of 10%.

Estimated timeframe for realization

1 to 3 years

Magnitude of potential financial impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

150,000,000

Potential financial impact figure – minimum (currency)

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

The financial impact is related to the estimated growth of the distributed generation market in the state of Minas Gerais, through the projects to be implemented by Cemig.

In 2012, Aneel Normative Resolution No. 482/2012 came into force, which establishes the general conditions for the access of microgeneration and distributed minigeration to the electric energy distribution systems through the electric energy compensation modalities. Thus, the Brazilian consumer was capable of generating its own electricity from renewable sources and provide the surplus to the electricity grid of its locality.

In the period between the publication of Resolution 482 in 2012 and December 2018, 10,713 generating units have already been connected by the Company, of which 10,622 (99%) are photovoltaic solar sources, 64 are thermal (biogas), 24 are hydraulic and three are cogeneration (biomass), totaling an installed capacity of 113.7 MW with Distributed Generation. Analyzing the national scenario, the connections made by Cemig represent 20% of all distributed generation connections in Brazil, and the 113.7 MW installed by Cemig represent 18% of the 676 MW installed in Brazil.

Type of opportunity

Efficiency

Primary water-related opportunity

Cost savings

Company-specific description & strategy to realize opportunity

In 2017, Cemig promoted the Concurso Ideia Iluminada (Illuminated Idea Contest) with the objective of acknowledging proposals from its employees that may reduce water consumption or the reuse. One of the selected projects aims at the use of rainwater to encourage the use of this resource and decrease the current value of the water bill. The objective of this project is to promote the adaptation of rainwater drainage from Vila Mariana Building to the collection, filtration, and storage to reduce the use of treated water, paying less for the water bill. The chosen area was a set of three roofs, located at Rua Santo Inácio Loyola, nº 56, district of Vila Mariana in Governador Valadares. We are interested in this area, mainly because there has been a growing increase in the amounts paid in the water bill and a good part of this treated water supplies the washing of sheds, yards, service areas, watering of gardens and plants, washing equipment in the workshop, etc. So if tap water and toilets continue to be supplied by treated water, we could substitute other uses for non-potable water.

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The project was initiated in December 2018 and its results were disclosed in a company's internal publication as a form of acknowledgment of the work performed.

Estimated timeframe for realization

4 to 6 years

Magnitude of potential financial impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

26,400

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact

Considering the average consumption in the analyzed period, it was 94.5 m³ per month, considering 55% of the economy, consumption drops to an average of 42 m³.

Turning this into real values, consumption of 94.5m³ is around BRL 800.00 (eight hundred Brazilian reais), with the drop to 42m³ this account drops to BRL 360.00 (three hundred and sixty Brazilian reais), so an economy of BRL 440.00 (four hundred and forty Brazilian reais) per month. In a period of 5 years (60 months) this implementation will bring us savings of about BRL 26,400.00 (twenty-six thousand and four hundred Brazilian reais).

Type of opportunity

Efficiency

Primary water-related opportunity

Cost savings

Company-specific description & strategy to realize opportunity

In 2017, Cemig promoted the Concurso Ideia Iluminada (Illuminated Idea Contest) with the objective of acknowledging proposals from its employees that may reduce water consumption or the reuse. One of the selected projects aims at the use of rainwater to encourage the use of this resource and decrease the current value of the water bill. The objective of this project is to promote the adaptation of rainwater drainage from Vila Mariana Building to the collection, filtration, and storage to reduce the use of treated water, paying less for the water bill. The chosen area was a set of three roofs, located at Rua Santo Inácio Loyola, nº 56, district of Vila Mariana in Governador Valadares. We are interested in this area, mainly because there has been a growing increase in the amounts paid in the water bill and a good part of this treated water supplies the washing of sheds, yards, service areas, watering of gardens and plants, washing equipment in the workshop, etc. So, if tap water and toilets continue to be supplied by treated water, we could substitute other uses for non-potable water.

The project was initiated in December 2018 and its results were disclosed in a company's internal publication as a form of acknowledgment of the work performed.

Estimated timeframe for realization

4 to 6 years

Magnitude of potential financial impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

26,400

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact

Considering the average consumption in the analyzed period, it was 94.5 m³ per month, considering 55% of economy, consumption drops to an average of 42 m³.

Turning this into real values, consumption of 94.5m³ is around BRL 800.00 (eight hundred Brazilian reais), with the drop to 42m³ this account drops to BRL 360.00 (three hundred and sixty Brazilian reais), so an economy of BRL 440.00 (four hundred and forty Brazilian reais) per month.

In a period of 5 years (60 months) this implementation will bring us savings of about BRL 26,400.00 (twenty-six thousand and four hundred Brazilian reais).

W5. Facility-level water accounting

W5.1

(W5.1) For each facility referenced in W4.1c, provide coordinates, total water accounting data and comparisons with the previous reporting year.

Facility reference number

Facility 1

Facility name (optional)

UHE Emborcação

Country/Region

Brazil

River basin

Other, please specify

Paranaíba River

Latitude

Longitude

-47.993888

Primary power generation source for your electricity generation at this facility

Hydroelectric

Total water withdrawals at this facility (megaliters/year)

8,466,810

Comparison of withdrawals with previous reporting year

Much higher

Total water discharges at this facility (megaliters/year)

6,998,010

Comparison of discharges with previous reporting year

Lower

Total water consumption at this facility (megaliters/year)

1,468,800

Comparison of consumption with previous reporting year

Much higher

Please explain

In 2017, the water withdrawal value of Emborcação was 5,078,509 megaliters/year. The discharge value was 8,078,778 megaliters and the value of consumption was -3,000,269 megaliters.

As the hydrological conditions of 2018 were better than those of 2017, it was possible to recover part of the storage conditions of the reservoir. Percentage of storage in 05/31/2018 = 22,0% and 05/31/2019 = 41.5%.

W5.1a

(W5.1a) For each facility referenced in W5.1, provide withdrawal data by water source.

Facility reference number

Facility 1

Facility name

UHE Emborcação

Fresh surface water, including rainwater, water from wetlands, rivers and lakes

8,466,810

Brackish surface water/seawater

0

Groundwater - renewable

0

Groundwater - non-renewable

0

Produced/Entrained water

0

Third party sources

0

Comment

In 2018, inflows to the Emborcação reservoir were better than in 2017.

W5.1b

(W5.1b) For each facility referenced in W5.1, provide discharge data by destination.

Facility reference number

Facility 1

Facility name

UHE Emborcação

Fresh surface water

6,998,010

Brackish surface water/Seawater

0

Groundwater

0

Third party destinations

0

Comment

In 2018, as the hydrological conditions of the system were better than those of 2017, the defluence of the Emborcação reservoir was reduced compared to 2017, thus allowing the recovery of the storage level of the reservoir.

W5.1c

(W5.1c) For each facility referenced in W5.1, provide the proportion of your total water use that is recycled or reused, and give the comparison with the previous reporting year.

Facility reference number

Facility 1

Facility name

UHE Emborcação

% recycled or reused

None

Comparison with previous reporting year

About the same

Please explain

Most of Cemig's energy generation has non-consumptive water use. There is low consumption in its operations, only in its thermoelectric plants and administrative activities, and the rate of recirculation of water is considered insignificant in these operations.

W5.1d

(W5.1d) For the facilities referenced in W5.1, what proportion of water accounting data has been externally verified?

Water withdrawals – total volumes

% verified

76-100

What standard and methodology was used?

The data was verified in the scope of the external audit of the 2018 Annual and Sustainability Report by SGS ICS Certificadora LTDA. The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI G4 Sustainability Reporting Guidelines, including indicators. SGS has developed a set of Sustainability Communication Assurance protocols based on best practices.

Water withdrawals – volume by source

% verified

76-100

What standard and methodology was used?

The data was verified in the scope of the external audit of the 2018 Annual and Sustainability Report by SGS ICS Certificadora LTDA. The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI G4 Sustainability Reporting Guidelines, including indicators. SGS has developed a set of Sustainability Communication Assurance protocols based on best practices.

Water withdrawals – quality

% verified

76-100

What standard and methodology was used?

The company has an Environmental Management System (ISO 14001) and Quality Management System (ISO 9001) in which the drinking water standards for human consumption are verified.

Water discharges – total volumes

% verified

76-100

What standard and methodology was used?

The data was verified in the scope of the external audit of the 2018 Annual and Sustainability Report by SGS ICS Certificadora LTDA. The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI G4 Sustainability Reporting Guidelines, including indicators. SGS has developed a set of Sustainability Communication Assurance protocols based on best practices.

Water discharges – volume by destination

% verified

76-100

What standard and methodology was used?

The data was verified in the scope of the external audit of the 2018 Annual and Sustainability Report by SGS ICS Certificadora LTDA. The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI G4 Sustainability Reporting Guidelines, including indicators. SGS has developed a set of Sustainability Communication Assurance protocols based on best practices.

Water discharges – volume by treatment method

% verified

76-100

What standard and methodology was used?

The company has an Environmental Management System (ISO 14001) and Quality Management System (ISO 9001) in which the treatment systems and the conditions of effluent releases in the company units are verified. The release conditions must comply with DN COPAM/CERH-MG nº1/2008, which provides for the classification of water bodies and environmental guidelines for their classification, as well as establishing the conditions and standards for effluent discharge, and other measures.

Water discharge quality – quality by standard effluent parameters

% verified

76-100

What standard and methodology was used?

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The company has an Environmental Management System (ISO 14001) and Quality Management System (ISO 9001) in which the legal requirements are met. The release conditions must comply with DN COPAM/CERH-MG nº1/2008, which deals with the classification of water bodies and environmental guidelines for their classification.

Water discharge quality – temperature

% verified

76-100

What standard and methodology was used?

The company has an Environmental Management System (ISO 14001) and Quality Management System (ISO 9001) in which the legal requirements are met. The release conditions must comply with DN COPAM/CERH-MG nº1/2008, which deals with the classification of water bodies and environmental guidelines for their classification.

Water consumption – total volume

% verified

76-100

What standard and methodology was used?

The data was verified in the scope of the external audit of the 2018 Annual and Sustainability Report by SGS ICS Certificadora LTDA. The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI G4 Sustainability Reporting Guidelines, including indicators. SGS has developed a set of Sustainability Communication Assurance protocols based on best practices.

Water recycled/reused

% verified

76-100

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What standard and methodology was used?

The amount of recycled water in the company is still not significant.

W6. Governance

W6.1

(W6.1) Does your organization have a water policy?

Yes, we have a documented water policy that is publicly available

W6.1a

(W6.1a) Select the options that best describe the scope and content of your water policy.

	Scope	Content	Please explain
R o w 1	Compan y-wide	<p>Description of business dependency on water</p> <p>Description of business impact on water</p> <p>Description of water-related performance standards for direct operations</p> <p>Commitment to align with public policy initiatives, such as the SDGs</p> <p>Commitments beyond regulatory compliance</p> <p>Commitment to water-related innovation</p> <p>Commitment to stakeholder awareness and education</p> <p>Commitment to water stewardship and/or collective action</p> <p>Acknowledgement of the human right to water and sanitation</p> <p>Recognition of environmental linkages, for example, due to climate change</p> <p>Other, please specify</p> <p>Commitment to conservation</p>	<p>Cemig, aware of the importance of water resources for the maintenance of its businesses and for society, establishes a Water Resources Policy with the objective of defining the principles that govern the Company's actions on the subject. When developing its activities, the Company undertakes to adopt integrated and sustainable practices for the rational use of water resources, prevention and defense against critical hydrological events, both of natural origin and arising from the undue use of natural resources, considering the water availability and the needs of current and future generations. This policy has the following principles: Water Resources Management, Water Resources Conservation, Participation in Public Management and compliance with Water Resources Legislation, Safe Reservoir Management, Climatological and Quantitative Water Monitoring, Water and Sediment Quality Monitoring, Relationship with Stakeholders and Research and Development.</p>

W6.2

(W6.2) Is there board level oversight of water-related issues within your organization?

Yes

W6.2a

(W6.2a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for water-related issues.

Position of individual	Please explain
Other C-Suite Officer	<p>The responsibility over hydric issues has been assigned to the Vice-President Director having in mind that the superintendence that deals directly with these matters (Environmental Management and Strategic Planning Superintendency) is subordinate to this director. The Vice-President Director in charge during 2018 has an executive formation in sustainability and 30 years of experience in corporative governance, business management, strategic planning, market analysis, audit, compliance, internal control, safety, health and sustainability.</p> <p>Cemig's administration is composed of the Executive Board and the Board of Directors. The Board of Directors members, elected by the Investors General Assembly, elect their President Director, Vice-President Director and choose their Executive Board. The Executive board, structure in which the Vice-President Director is part of, is considered a group that belongs to the Company's administration. The Vice-President Director has functions attributed to him, which are defined by the Board of Directors, which are: Contribute to the President Director in exercising his duties and substituting him in case of vacancy, impeachment or renouncing. The Director President's functions include, among others: a) coordinate and administrate the Company's jobs, as well as all strategic and institutionalized activities; b) coordinate the elaboration, consolidation and implementation of a Long-Term Strategy and the Company's multiannual business plan, alongside the assigned director, with the participation of other directors; g) be accountable for the Governance Secretary, Strategic Planning, Compliance, and Corporative Risk Management; and, i) offer indications to Administrative and Financial positions on the full-time subsidiaries, affiliates, and consortia that the Company is part of, as well as statutory bodies of Fundação Forluminas de Seguridade Social – Forluz and Camig Saúde (Health), once the responsible/assigned Director has a saying on it.</p>

W6.2b

(W6.2b) Provide further details on the board's oversight of water-related issues.

	Frequency that water-related issues are a scheduled agenda item	Governance mechanisms into which water-related issues are integrated	Please explain
Row 1	Scheduled - all meetings	<ul style="list-style-type: none"> Monitoring implementation and performance Overseeing acquisitions and divestiture Overseeing major capital expenditures Reviewing and guiding annual budgets Reviewing and guiding business plans Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding strategy Reviewing and guiding corporate responsibility strategy Reviewing innovation/R&D priorities Setting performance objectives 	<p>Cemig has indicators for the management of water resources, which are analyzed periodically, showing the tendency to meet the targets and enabling any necessary interventions. The Energy Efficiency Index of the Power Plants - IEPE is a highlight, it measures the efficiency of the energetic operation of Cemig's hydroelectric plants, comparing the verified energy generation to the optimal generation, taking into account the observed flows, the maintenance of generating units and the attendance to operational restrictions. This indicator is aligned with the corporate map of the Energy Generation business, linked to the strategic objective "Increase operational efficiency". The higher the result, the better the water use planning for electricity generation. As in the last years, due to the low affluence observed, there was virtually no verifying at the mills. This eventually contributed to the IEPE result again exceeding the target, which for the year 2018 was 93%. The IEPE 2018 result was 93.23%.</p> <p>The responsibility for reporting to the Council on water issues belongs to the Director of Generation and Transmission.</p>

W6.3

(W6.3) Provide the highest management-level position(s) or committee(s) with responsibility for water-related issues (do not include the names of individuals).

Name of the position(s) and/or committee(s)

Chief Operating Officer (COO)

Responsibility

Managing water-related risks and opportunities

Frequency of reporting to the board on water-related issues

More frequently than quarterly

Please explain

The person who is at the highest level of direct responsibility for the water theme at Cemig is the Chief Generation and Transmission Officer, that reports directly to the CEO. Since water is the main raw material for power generation, the Chief Generation and Transmission Officer monitors the water resources daily, through the level of the Company's reservoirs and weather forecasts. The most relevant information on the subject is presented weekly at Board meetings and monthly at meetings of the Board of Directors.

Name of the position(s) and/or committee(s)

Other, please specify

Risk Monitoring Committee

Responsibility

Assessing water-related risks and opportunities

Frequency of reporting to the board on water-related issues

Please explain

This committee is responsible for advising the Board of Executive Board on the fulfillment of responsibilities related to corporate risk management, accompanying them and recommending mitigation actions. The following attributions can be highlighted: Promote the discussion of strategic and operational matters in the Corporate Risk Management Process; Continuously monitor the scenario in which the Company is inserted and its corporate risk matrix, aiming to identify the main risks and recommend priority mitigation actions to be proposed to the Board of Executive Officers; Continuously monitor the scenario in which the Company is inserted and its corporate risk matrix, aiming to identify the main risks and recommend priority mitigation actions to be proposed to the Board of Executive Officers; Recommend, for approval by the Board of Executive Officers, guidelines and procedures to be adopted in the Corporate Risk Monitoring Process.

W-FB6.4/W-CH6.4/W-EU6.4/W-OG6.4/W-MM6.4

(W-FB6.4/W-CH6.4/W-EU6.4/W-OG6.4/W-MM6.4) Do you provide incentives to C-suite employees or board members for the management of water-related issues?

Yes

W-FB6.4a/W-CH6.4a/W-EU6.4a/W-OG6.4a/W-MM6.4a

(W-FB6.4a/W-CH6.4a/W-EU6.4a/W-OG6.4a/W-MM6.4a) What incentives are provided to C-suite employees or board members for the management of water-related issues (do not include the names of individuals)?

	Who is entitled to benefit from these incentives?	Indicator for incentivized performance	Please explain
Monetary reward	Corporate executive team Other C-suite Officer Deputy Chief Executive Officer	Other, please specify Amount of Energy Impacted by the Mechanism for Reducing Physical Warranty	Indicator: Represents the total amount of energy (MWh) impacted by the Mechanism of Reduction of the Physical Guarantee, considering the Physical Guarantee of all the generation activities considered. This Indicator is valid for hydroelectric plants dispatched centrally and with the participation of the CE-MIG GT in the operation and/or maintenance processes. The verified values and the result projections of this indicator reflect the performance of the operational availability of each plant, in a cumulative period of 60 months, compared to a reference value for the availability, defined by ANEEL, and can represent up to 10% of the variable remuneration of the Director of Generation and Transmission. In order to receive this benefit, the indicator should be <28.00MWh.
Recognition (non-monetary)	Other, please specify Employees	Efficiency project or target – direct operations	In 2017, Cemig promoted the 'Ideia Iluminada' contest, which had as the objective, finding solutions to reduce fuel consume, energy and water consume efficiency, and reducing residue production. Out of the 44 projects submitted by Cemig employees, the first implemented was a river water re-usage to the Company's main building in the Vila Mariana neighborhood, in Governador Valadares. The project was inaugurated in December of 2018 and its results were made available in an intern publication as a way of recognizing the work done.
Other non-monetary reward			

W6.5

(W6.5) Do you engage in activities that could either directly or indirectly influence public policy on water through any of the following?

Yes, direct engagement with policy makers

Yes, other

W6.5a

(W6.5a) What processes do you have in place to ensure that all of your direct and indirect activities seeking to influence policy are consistent with your water policy/water commitments?


Cemig actively participates in all deliberative and regulatory forums for water resources at the federal and state levels, such as the National and State Water Resources Councils, River Basin Committees, Technical Chambers and Working Groups. With a focus on Minas Gerais, Cemig is a member of 21 state hydro-basin committees and 04 federal committees. It is also a member of the Brazilian Association of Electricity Generating Companies (Abrage), with effective action in the Working Group of Water Resources (GTRH). With this initiative, Cemig influences the policies and guidelines and monitors regulatory trends, which is an important support for the estimation of impacts on the Company's ventures at the local level.

Employees participating in these forums are properly prepared to represent the interests of the company. Only technical specialists in water resources participate in these events, as a way to guarantee the consistency between the company's performance and the official's speech. If there is a deviation of conduct, there is a code of ethics that regulates these situations, such as the establishment of disciplinary processes. However, this has never occurred, which can be seen by the good results in the management of water conflicts (Três Marias HPP and Rio de Pedras SHP case study).

W6.6

(W6.6) Did your organization include information about its response to water-related risks in its most recent mainstream financial report?

Yes (you may attach the report - this is optional)

 H 4T_2018 English.pdf

W7. Business strategy

W7.1

(W7.1) Are water-related issues integrated into any aspects of your long-term strategic business plan, and if so how?

	Are water-related issues integrated?	Long-term time horizon (years)	Please explain
Long-term business objectives	Yes, water-related issues are integrated	16-20	<p>The main drivers of Cemig's business strategy are defined for two time-horizons: 2025 and 2040, considered the medium and long terms and are related to balanced growth, both through new projects and via mergers and acquisitions, as the main commitments sustainable growth and the aggregation of shareholder value in the long term. Aiming the expansion of the installed capacity through a low-risk portfolio. One of the guidelines is the recovery of its energy generation capacity from renewable sources (hydroelectric, wind and solar).</p> <p>The time horizon is related to the new strategic drivers, approved in 2018. In this line of action, the strategy of buying incentivized energy (wind and solar) by auction is highlighted. In this process in 2018, 44 companies were approved, with 181 registered ventures. The projects totalled 5,500 MW of installed power, with an amount of energy of more than 2,000 average MW. 431.49 MWm were acquired in 1240 MW of installed capacity, about 22.5% of what was on offer. With this strategy, Cemig seeks to serve its customers, despite the expiration of the concessions of its hydroelectric plants (Volta Grande, Miranda, Jaguará and São Simão).</p>

	Are water-related issues integrated?	Long-term time horizon (years)	Please explain
Strategy for achieving long-term objectives	Yes, water-related issues are integrated	16-20	<p>The main drivers of Cemig's business strategy are defined for two time horizons: 2025 and 2040, considered medium and long term. In this line of action, the strategy to increase the installed capacity of existing plants stands out, for example the PCH Poço Fundo will be expanded by 20.84 MW. The company has an area dedicated to the analysis of scenarios, risks and opportunities and market trends that is responsible for the preparation of strategic planning. The company's strategic planning considers aspects of eco-efficiency and environmental management, setting goals to reduce water consumption throughout the company.</p> <p>The risks and opportunities related to water are classified and prioritized in matrixes of exposure by the Corporate Risk Monitoring Committee and presented to the Executive Board. These evaluations are therefore presented to top management, which uses them in the development of the Company's Strategic Planning. As Cemig's strategy is defined and approved by the Board of Executive Officers, the other directories develop the planning of their activities. The Strategic Planning process is conducted by the Board of Directors, with the participation of the Executive Board.</p> <p>The medium and long-term strategy (2021 to 2040) includes the recovery of generation capacity by acting as an energy marketer in the free market and through participation in energy auctions, in addition to taking advantage of the opportunities for solar and wind energy.</p>
Financial planning	Yes, water-related issues are integrated	16-20	<p>There is a financial planning in which water issues are integrated to mitigate the risks of loss of hydroelectric generation capacity due to future unfavorable hydrological scenarios, considering the medium and long term (2021 to 2040). One of the adopted strategies was the financial planning for the purchase of renewable energy (solar and wind) through auctions. In 2018, Cemig acquired 431.49 MWm in this type of auctions. The time horizon is related to the new strategic drivers was approved in 2018.</p>

W7.2

(W7.2) What is the trend in your organization's water-related capital expenditure (CAPEX) and operating expenditure (OPEX) for the reporting year, and the anticipated trend for the next reporting year?

Row 1

Water-related CAPEX (+/- % change)

159

Anticipated forward trend for CAPEX (+/- % change)

88

Water-related OPEX (+/- % change)

-93

Anticipated forward trend for OPEX (+/- % change)

-26.5

Please explain

Investment data (CAPEX) in 2018 are related to the modernization of the Telemetric Hydrometeorological System (STH).

The OPEX Data are: hydrometeorological network operation and financial compensation for the use of water resources (CFURH). The variation of the CAPEX, from the previous cycle to the current one, is related to the amount invested in the modernization of the STH.

Concerning the reduction of OPEX, the large reduction in the amount paid for financial compensation (-50% of the previous cycle) can be attributed to the loss of concessions.

By 2019, an increase in investment is expected due to the implementation of the Emergency Action Plan - Dams Security Law, as well as the continuation of the modernization of the STH.

The significant variation of CAPEX and OPEX continues, due to the needs of adequations and attendance to regulatory demands in the sector. It is estimated that for the next few years OPEX will continue its reduction.

W7.3

(W7.3) Does your organization use climate-related scenario analysis to inform its business strategy?

	Use of climate-related scenario analysis	Comment
R o w 1	Yes	<p>Based on the Corporate Risk Management System, Cemig analyzes the scenarios and determines the degree of financial exposure to risks, considering the probability of occurrence and its impact and establishes control measures for the following risks: sedimentation of the reservoirs, deviations in the weather forecast, loss of physical guarantee of SHPs and reduction of water availability with impacts on commercialization.</p> <p>The company also invests in research projects and weather forecasting tools that can impact its business.</p> <p>It can be highlighted the acquisition of the meteorological radar and participation in the projects of R&D GT 0552 - Evaporation of the reservoir of the Funil Hydroelectric Power Plant: Characterization of the Water Footprint and Strategic R&D Project No. 010/2008 "Effect of Climate Change on Electric Power Generation".</p>

W7.3a

(W7.3a) Has your organization identified any water-related outcomes from your climate-related scenario analysis?

Yes

W7.3b

(W7.3b) What water-related outcomes were identified from the use of climate-related scenario analysis, and what was your organization's response?

Climate-related scenario(s)	Description of possible water-related outcomes	Company response to possible water-related outcomes
<p>R o w 1</p> <p>RCP 2.6 Other, please specify RCPs 4.5; 6.0; 8.5</p>	<p>The result of the Strategic R&D Project No. 1010/2008 "Effect of Climate Change on Electric Power Generation" indicates an increase in air temperature in all regions of the country and reduction of rainfall, mainly in the Amazon and Northeast Region of Brazil and increase in the South Region of the country. For the simulation of hydrology, the distributed hydrological model MGB-IPH was developed to represent the processes of rainfall transformation in large-scale basins. Two generator parks were considered: Existing Generator Park (PGE, Parque Gerador Existente), which are the existing plants and Future Generator Park (PGF, Parque Gerador Futuro) represents the set of plants planned to start operating in 2030. The calculation of Energy Assured Supply System (EASS) was made for the horizons of 2040, 2070 and 2100. Future 01 (2011 to 2040), Future 02 (2041 to 2070) and Future 03 (2071 to 2099). Another project developed by Cemig was the R&D GT 0552 - Evaporation of the reservoir of the Funil Hydroelectric Power Plant: Characterization of the Water Footprint. Three HPPs installed in cascade were evaluated and the following impacts were considered: reduction / increase of energy production potential: impact on the water footprint; interruptions of electricity production due to low water availability. To simulate the impacts of climate change on runoff, the scenarios RCP.</p>	<p>The company has an area specialized in water resources management and risk management area. These two areas are responsible for the identification of water risks, qualification and quantification of impacts and definition of actions to minimize risks.</p> <p>The following control measures were established: real-time monitoring of the amount of water available in rivers and power plants through 262 telemetry stations belonging to the Telemetry and Hydrometeorological Monitoring System (STH, Sistema de Telemetria e Monitoramento Hidrometeorológico); monitoring of sediments in 86 stations located in its hydroelectric power plants, where water samples are collected and analyzed in an accredited laboratory; In addition, whenever Cemig evaluates the feasibility of a new enterprise, the company considers three important points to evaluate its exposure to the risks related to water availability in the study site:</p> <ul style="list-style-type: none"> • the historical flow series; • the rules established by the managing body of water resources for withdrawal of water in the stretch of the river; • the priorities for the use of water resources determined in the Hydrographic Basin Master Plan, which identifies management actions, programs, projects, works and priority investments, with the participation of public agents and users.

W7.4

(W7.4) Does your company use an internal price on water?

Row 1

Does your company use an internal price on water?

Yes

Please explain

The electricity generation sector has been paying, since 1990, a sectorial tax called Financial Compensation for the Use of Water Resources for the Hydroelectric Generation (CFURH, Compensação Financeira pela Utilização de Recursos Hídricos), instituted by Law No. 7.990 of 1989. Cemig, as the entire user sector of water for hydroelectric power generation, was charged for the use of the water resource defined and implemented for its hydroelectric power plants even before the River Basin Committees were set up. The charging for hydroelectric power plants with an installed capacity above 30 MW was instituted and started in all the state and federal river basins in August 2000, with the publication of Law No. 9.984. It is also important to remember that it is the only sector that undergoes annual readjustment of the amounts collected, through the readjustment and revision of the Updated Reference Rate (TAR). In 2017 it was BRL 72.20 and for 2018 it was fixed at BRL 74.03.

W8. Targets

W8.1

(W8.1) Describe your approach to setting and monitoring water-related targets and/or goals.

	Levels for targets and/or goals	Monitoring at corporate level	Approach to setting and monitoring targets and/or goals
R o w 1	<p>Company-wide targets and goals</p> <p>Business level specific targets and/or goals</p> <p>Activity level specific targets and/or goals</p> <p>Site/facility specific targets and/or goals</p>	<p>Targets are monitored at the corporate level</p> <p>Goals are monitored at the corporate level</p>	<p>The Planning and Strategic Management Super-intendency is responsible for proposing and monitoring water consume goals and other hydric related issues.</p> <p>The goals set by this branch are presented to the Executive Board for approval. Once the Board approves the goals, they are included in the annual revision protocol within the Pluriannual Business Plan (5 years) and on the Company's long-term strategy. The goals are incorporated into the Strategic Plan as soon as the Board of Directors deliberates it.</p> <p>The Civil Maintenance and Dam Security Administration and the Energetic Planning Administration are responsible for implementing the Emergency Response Plan.</p>

W8.1a

(W8.1a) Provide details of your water targets that are monitored at the corporate level, and the progress made.

Target reference number

Target 1

Category of target

Water consumption

Level

Company-wide

Primary motivation

Recommended sector best practice

Description of target

Reduce water consumption.

Cemig seeks to reduce the water consumption of its facilities through campaigns to raise awareness and carry out preventive maintenance.

Quantitative metric

% reduction in total water consumption

Baseline year

2011

Start year

2012

Target year

2020

% achieved

100

Please explain

Cemig's water consumption occurs in the operational and administrative areas related to hydroelectric power generation, transmission and distribution of electricity, in 2017, administrative consumption represented 87% of the total and the industrial process (cooling) of Cemig's thermal power stations (Igarapé Thermal Power Stations -131 MW), this data is strongly influenced by the power generation of the thermal power station.

There was an 88.9% reduction in the company's water consumption, confirming the achievement of the target, which, by 2018, was to reduce total water consumption by 4%. This result is the result of measures such as change of processes, management of the consumption of the

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facilities and a faster action in the correction of leaks, retrofit of Júlio Soares building in which it consists of the replacement of water pipes and the adequacy of the building infrastructure, besides the implementation of new equipment that reduces consumption.

Target reference number

Target 2

Category of target

Water consumption

Level

Site/facility

Primary motivation

Recommended sector best practice

Description of target

Reduce water consumption in the Igarapé Thermal Power Plant: reduce water consumption by at least 5%, by 2020, based on the 2007 consumption of 42,081m³.

Quantitative metric

% reduction in total water consumption

Baseline year

2007

Start year

2013

Target year

2020

% achieved

100

Please explain

In recent years, Cemig has carried out a refurbishment in the Igarapé Thermal Power Plant in which leaks were identified and eliminated, which led to the achievement of the target.

In 2018, industrial consumption totaled 25,501 m³ of water, a decrease of 8.8% when compared to that of 2017.

Target reference number

Target 3

Category of target

Water consumption

Level

Business

Primary motivation

Recommended sector best practice

Description of target

Reduce water consumption. This objective applies to the generation, transmission and distribution of energy businesses.

Quantitative metric

% reduction in total water consumption

Baseline year

2011

Start year

2012

Target year

2020

% achieved

100

Please explain

Cemig's water consumption occurs in the operational and administrative areas related to hydroelectric power generation, transmission and distribution of electricity, in 2017, administrative consumption represented 87% of the total and the industrial process (cooling) of Cemig's thermal power stations (Igarapé Thermal Power Stations -131 MW), this data is strongly influenced by the power generation of the thermal power station.

There was an 88.9% reduction in the company's water consumption, confirming the achievement of the target, which, by 2018, was to reduce total water consumption by 4%. This result is the result of measures such as change of processes, management of the consumption of the facilities and a faster action in the correction of leaks, retrofit of Júlio Soares building in which it consists of the replacement of water pipes and the adequacy of the building infrastructure, besides the implementation of new equipment that reduces consumption.

Target reference number

Target 4

Category of target

Water use efficiency

Level

Business activity

Primary motivation

Increased revenue

Description of target

Cemig has indicators for the management of water resources, which are analyzed periodically, showing the tendency to meet the targets and making possible any necessary interventions. The Energy Efficiency Index of the Power Plants - IEPE (Índice de Eficiência no Planejamento Energético das Usinas), which measures the efficiency of the energy operation of Cemig's hydroelectric power plants, is the most important,

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comparing verified power generation with respect to optimum generation, taking into account the observed flows, the maintenance of generating units and compliance with the operating restrictions. The aim is to have, in 2019, the Energy Efficiency Index of the Power Plants - IEPE greater than 93%.

Quantitative metric

% reduction in total water withdrawals

Baseline year

2010

Start year

2017

Target year

2019

% achieved

100

Please explain

In 2017, a goal of the Energy Planning Efficiency Index - IEPE of the Power Plants was established: greater than 92.5%. As in 2017, in 2018 there was practically no verifying at the plants due to the low inflows in the period, contributing so that the IEPE result also surpassed the goal. For 2018, the target is 93%. In 2018, the IEPE result was 93.23%.

W8.1b

(W8.1b) Provide details of your water goal(s) that are monitored at the corporate level and the progress made.

Goal

Promotion of water data transparency

Level

Motivation

Brand value protection

Description of goal

Disseminate information regarding the management and use of water by Cemig. The company aims to participate in the main indexes and sustainability ratings and for this, it publishes its practices concerning the theme. Thus, it established as a goal the report to CDP WATER and have the scope of the evaluation in the level A. This result is relevant for company, since it has 95.97% of hydroelectric generation and standing out can attract investors and increase its market value. Additionally, the company has demonstrated evolution in its practices and the achievement of the level A establishes the result of this work.

Baseline year

2014

Start year

2016

End year

2020

Progress

Cemig answered the CDP WATER questionnaire for two years as a training, without submitting it. As of 2016, we began to submit the questionnaire and in 2017 and 2018 we were recognized in category A-.

Goal

Engaging with local community

Level

Site/facility

Motivation

Description of goal

According to the law no. 12,344 / 2010 and the Resolution 696 of the National Electric Energy Agency - Aneel, any entrepreneur, understood as a private or governmental agent, with a real right over the lands where the dam and the reservoir are located or that exploit the dam for its own benefit or of the community, should prepare an Emergency Action Plan (EAP).

One of the assumptions of the Plan is that in one of the planning stages, engagement with stakeholders should be addressed, in the case of Cemig involving communities throughout the area covered by its 49 dams.

Thus, Cemig's goal is to create 24 External PAEs in approximately 45 municipalities. This indicator is relevant because the document focuses on presenting the risk of flooding caused by ordinary floods and possible dam rupture events. The objective is to build a culture of readiness for flood situations for the communities installed along the rivers where the Cemig plants are located.

Baseline year

2015

Start year

2016

End year

2020

Progress

In compliance with the Law No. 12.344/2010 and ANEEL Resolution No. 696, an education and communication program on dam safety is being developed with the purpose of raising awareness of the importance of dam safety, which will include the following measures:

- i. support and promotion of decentralized actions to raise awareness and development of knowledge about dam safety;
- ii. preparation of didactic material;
- iii. maintenance of a public information system on the safety of dams under its jurisdiction;
- iv. promotion of partnerships with educational institutions, research and technical associations related to the engineering of dams and related areas;
- v. annual availability of the Dams Safety Report.

All of these actions will be contemplated in Cemig's Dams Safety Communication Plan, which will be developed in stages over the next five years.

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In the years 2017 and 2018, a total of 18 External PAEs were delivered, encompassing 60 municipalities. During the year 2019, another 24 External PAE will be delivered to around 45 municipalities. The success indicator is the number of SAPs completed.

Goal

Watershed remediation and habitat restoration, ecosystem preservation

Level

Business

Motivation

Reduced environmental impact

Description of goal

Conduct R&D project Intelligent Monitoring of Water Quality in Hydropower Reservoirs Through the Development of a Photogrammetric Algorithm, with the objective of using satellite images to monitor the quality of the water through satellite images without going to the field. It is proposed to increase the availability and accuracy of data obtained from environmental monitoring of water quality and reservoir environment by developing algorithms for processing high-resolution images obtained by unmanned aerial vehicles (VANTs) in combination with satellite images and data traditionally obtained in the field. The case of Três Marias-MG Reservoir is considered as a case study.

This project is relevant because the company has 95.97% of hydroelectric generation and the monitoring of water quality represents an important variable to guarantee the operation and to avoid environmental sanctions.

Baseline year

2015

Start year

2016

End year

2020

Progress

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 The project is in the signatures stage with the research institution at the Federal University of Minas Gerais - UFMG. The progress of the project will be measured from the expected results, the success indicators are:

- i) Develop algorithms to evaluate the water quality and the reservoir environment, in the study area, from multispectral images;
- ii) Develop methodologies for calibration and validation of algorithms for analysis of water quality and reservoir environment from multispectral images;
- iii) Optimization of the monitoring network, considering the location of the stations, the frequency of monitoring and the most important parameters for the characterization of the water quality in the region of study, using multivariate statistical analysis;
- iv) Application and validation of the statistical tools for the integration of historical water quality monitoring series, aiming at meeting the various purposes of the network, such as the analysis of trends in the evolution of water quality, identification of critical areas of pollution and verification of effectiveness management of water quality recovery actions;
- v) Development of protocols for automation and optimization of water quality monitoring processes combined with traditional methods.

W9. Linkages and trade-offs

W9.1

(W9.1) Has your organization identified any linkages or tradeoffs between water and other environmental issues in its direct operations and/or other parts of its value chain?

Yes

W9.1a

(W9.1a) Describe the linkages or tradeoffs and the related management policy or action.

Linkage or tradeoff

Tradeoff

Type of linkage/tradeoff

Other, please specify

Description of linkage/tradeoff

The operation of reservoirs that Cemig uses for hydroelectric power generation essentially implies the consideration of multiple uses of water by other users of the river basin, which, in turn, leads to the need to consider a series of environmental restrictions, security, irrigation systems, human supplies, waterways, bridges, among others, rigorously respected by Cemig.

In 2018, the severe crisis in the Rio das Velhas basin (where the Rio de Pedras SHP is located) affected the public supply conditions of about 2.4 million people, which represents about 50% of the Metropolitan Region of Belo Horizonte - RMBH. Therefore, Cemig worked with several other users of the basin. In this context, the Upper Rio das Velhas Flow Management Group was set up, led by CBH Velhas and formed by the participating users of CBH - Cemig, COPASA, Anglo Gold Ashanti and having the support of the Mining Institute of Water Management - IGAM.

Policy or action

The Alto Rio das Velhas Flow Manager group proposed and executed the integrated management and operation of the reservoirs of the upper Rio das Velhas, SHPP Rio de Pedras and reservoirs of the Rio do Peixe Generator Complex, located upstream of the capture of ETA Bela Fama.

To preserve water stocks, so they are used in critical moments of low outflows in the capture at ETA Bela Fama, the group proposed the alteration of the concession of Hydroelectric Use of PCH Rio de Pedras. Both (alteration of grant and the integrated operation) enabled the balancing out the effects of the long period of drought, avoiding a water supply crisis in a part of Belo Horizonte's Metropolitan Region. The impact of this action is of low magnitude, since the PCH Rio de Pedras (9.28MW) represents less than 1% of the installed capacity of Cemig.

W10. Verification

W10.1

(W10.1) Do you verify any other water information reported in your CDP disclosure (not already covered by W5.1d)?

Yes

W10.1a

(W10.1a) Which data points within your CDP disclosure have been verified, and which standards were used?

Disclosure module	Data verified	Verification standard	Please explain
W0. Introduction	The profile of Cemig was verified.	ISAE3000	<p>SGS was contracted by CEMIG to perform the independent assurance of its "2018 ANNUAL AND SUSTAINABILITY REPORT". The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI Standards Sustainability Reporting Guidelines, including indicators.</p> <p>This report was secured using our protocols to assess the truthfulness of the content and its alignment with the GRI Standards Guidelines for Sustainability Reporting in accordance with the material topics identified by CEMIG through the process described in this report. In addition, the GRI Electric Utilities industry supplement was also used. Based on this context, the "RELAT2018" is characterized as the Essential Level.</p> <p>The assurance process comprised (i) the review of indicators, information and data present in the preliminary version of the sustainability report (ii) interviews with strategic collaborators, both to understand the data in the report and to understand the management processes involved with the material issues and (ii) revision of complementary documentation sent by CEMIG to SGS. CEMIG's accounting information contained in and/or referenced in the "2018 ANNUAL AND SUSTAINABILITY REPORT" was not evaluated as part of this assurance process.</p>

Disclosure module	Data verified	Verification standard	Please explain
W1. Current state	Data on consumption of industrial water, water for administrative consumption and effluents were verified.	ISAE3000	<p>SGS was contracted by CEMIG to perform the independent assurance of its "2018 ANNUAL AND SUSTAINABILITY REPORT". The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI Standards Sustainability Reporting Guidelines, including indicators.</p> <p>This report was secured using our protocols to assess the truthfulness of the content and its alignment with the GRI Standards Guidelines for Sustainability Reporting in accordance with the material topics identified by CEMIG through the process described in this report. In addition, the GRI Electric Utilities industry supplement was also used. Based on this context, the "2018 ANNUAL AND SUSTAINABILITY REPORT" is characterized as the Essential Level.</p> <p>The assurance process comprised (i) the review of indicators, information and data present in the preliminary version of the sustainability report (ii) interviews with strategic collaborators, both to understand the data in the report and to understand the management processes involved with the material issues and (ii) revision of complementary documentation sent by CEMIG to SGS. CEMIG's accounting information contained in and/or referenced in the "2018 ANNUAL AND SUSTAINABILITY REPORT" was not evaluated as part of this assurance process.</p>

Disclosure module	Data verified	Verification standard	Please explain
W3. Procedures	We verified the information of the item "Water Resources" in the scope of the verification of the 2018 Annual Sustainability Report	AA1000AS	<p>SGS was contracted by CEMIG to perform the independent assurance of its "2018 ANNUAL AND SUSTAINABILITY REPORT". The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI Standards Sustainability Reporting Guidelines, including indicators.</p> <p>This report was secured using our protocols to assess the truthfulness of the content and its alignment with the GRI Standards Guidelines for Sustainability Reporting in accordance with the material topics identified by CEMIG through the process described in this report. In addition, the GRI Electric Utilities industry supplement was also used. Based on this context, the "2018 ANNUAL AND SUSTAINABILITY REPORT" is characterized as the Essential Level.</p> <p>The assurance process comprised (i) the review of indicators, information and data present in the preliminary version of the sustainability report (ii) interviews with strategic collaborators, both to understand the data in the report and to understand the management processes involved with the material issues and (ii) revision of complementary documentation sent by CEMIG to SGS. CEMIG's accounting information contained in and/or referenced in the "2018 ANNUAL AND SUSTAINABILITY REPORT" was not evaluated as part of this assurance process.</p>

Disclosure module	Data verified	Verification standard	Please explain
W4. Risks and opportunities	The information on the item "Risk Management" was verified in the scope of the verification of the 2018 Annual Sustainability Report	AA1000AS	<p>SGS was contracted by CEMIG to perform the independent assurance of its "2018 ANNUAL AND SUSTAINABILITY REPORT". The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI Standards Sustainability Reporting Guidelines, including indicators.</p> <p>This report was secured using our protocols to assess the truthfulness of the content and its alignment with the GRI Standards Guidelines for Sustainability Reporting in accordance with the material topics identified by CEMIG through the process described in this report. In addition, the GRI Electric Utilities industry supplement was also used. Based on this context, the "2018 ANNUAL AND SUSTAINABILITY REPORT" is characterized as the Essential Level.</p> <p>The assurance process comprised (i) the review of indicators, information and data present in the preliminary version of the sustainability report (ii) interviews with strategic collaborators, both to understand the data in the report and to understand the management processes involved with the material issues and (ii) revision of complementary documentation sent by CEMIG to SGS. CEMIG's accounting information contained in and/or referenced in the "2018 ANNUAL AND SUSTAINABILITY REPORT" was not evaluated as part of this assurance process.</p>

Disclosure module	Data verified	Verification standard	Please explain
W6. Governance	We verified the information of the item "Water Resources" in the scope of the verification of the 2018 Annual Sustainability Report	AA1000AS	<p>SGS was contracted by CEMIG to perform the independent assurance of its "2018 ANNUAL AND SUSTAINABILITY REPORT". The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI Standards Sustainability Reporting Guidelines, including indicators.</p> <p>This report was secured using our protocols to assess the truthfulness of the content and its alignment with the GRI Standards Guidelines for Sustainability Reporting in accordance with the material topics identified by CEMIG through the process described in this report. In addition, the GRI Electric Utilities industry supplement was also used. Based on this context, the "2018 ANNUAL AND SUSTAINABILITY REPORT" is characterized as the Essential Level.</p> <p>The assurance process comprised (i) the review of indicators, information and data present in the preliminary version of the sustainability report (ii) interviews with strategic collaborators, both to understand the data in the report and to understand the management processes involved with the material issues and (ii) revision of complementary documentation sent by CEMIG to SGS. CEMIG's accounting information contained in and/or referenced in the "2018 ANNUAL AND SUSTAINABILITY REPORT" was not evaluated as part of this assurance process.</p>

Disclosure module	Data verified	Verification standard	Please explain
W7. Strategy	The information on the item "Strategy" was verified in the scope of the verification of the 2018 Annual Sustainability Report	AA1000AS	<p>SGS was contracted by CEMIG to perform the independent assurance of its "2018 ANNUAL AND SUSTAINABILITY REPORT". The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI Standards Sustainability Reporting Guidelines, including indicators.</p> <p>This report was secured using our protocols to assess the truthfulness of the content and its alignment with the GRI Standards Guidelines for Sustainability Reporting in accordance with the material topics identified by CEMIG through the process described in this report. In addition, the GRI Electric Utilities industry supplement was also used. Based on this context, the "2018 ANNUAL AND SUSTAINABILITY REPORT" is characterized as the Essential Level.</p> <p>The assurance process comprised (i) the review of indicators, information and data present in the preliminary version of the sustainability report (ii) interviews with strategic collaborators, both to understand the data in the report and to understand the management processes involved with the material issues and (ii) revision of complementary documentation sent by CEMIG to SGS. CEMIG's accounting information contained in and/or referenced in the "2018 ANNUAL AND SUSTAINABILITY REPORT" was not evaluated as part of this assurance process.</p>

Disclosure module	Data verified	Verification standard	Please explain
W8. Targets	The information on the item "Strategy" was verified in the scope of the verification of the 2018 Annual Sustainability Report	AA1000AS	<p>SGS was contracted by CEMIG to perform the independent assurance of its "2018 ANNUAL AND SUSTAINABILITY REPORT". The assurance scope, based on the methodology for assurance of the SGS Sustainability Reports, included the text and data related to the GRI Standards Sustainability Reporting Guidelines, including indicators.</p> <p>This report was secured using our protocols to assess the truthfulness of the content and its alignment with the GRI Standards Guidelines for Sustainability Reporting in accordance with the material topics identified by CEMIG through the process described in this report. In addition, the GRI Electric Utilities industry supplement was also used. Based on this context, the "2018 ANNUAL AND SUSTAINABILITY REPORT" is characterized as the Essential Level.</p> <p>The assurance process comprised (i) the review of indicators, information and data present in the preliminary version of the sustainability report (ii) interviews with strategic collaborators, both to understand the data in the report and to understand the management processes involved with the material issues and (ii) revision of complementary documentation sent by CEMIG to SGS. CEMIG's accounting information contained in and/or referenced in the "2018 ANNUAL AND SUSTAINABILITY REPORT" was not evaluated as part of this assurance process.</p>

W11. Sign off

W-FI

(W-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.

Water is the strategic resource in which Cemig relies its business on, since 99.8% of all electric energy comes from hydroelectric powerplants and 0.2% comes from UTE Igarape. The Company recognizes its role on preserving this resource as well as the potential impacts of its activities on hydric availability.

Having that in mind, Cemig does actions that make it viable to manage and prevent possible hydric-availability related impacts on its business and invests in practices that put it in a better and safer position in every possible scenery, through the usage of modern techniques and equipment such as the Storm Locating System, and the Telemetry and Hydrometeorological Monitoring System, which use mathematical models to simulate and forecast the weather.

Currently, Cemig operates in a hydrometeorological network that generates 381 data series, with 147 of rains, 104 of river flows, 56 of reservoirs and river water levels, 36 climate stations, which monitor the temperature, air humidity, wind speed and direction, solar radiation, and atmospheric pressure, and 38 of reservoirs water quality.

Cemig's reservoirs water quality is regularly monitored in a network with 47 reservoirs and over 200 data collection stations (Physical, chemical, and biological in Minas Gerais' main watersheds). Collections generate a constant data flow, which is analyzed and stored, creating an extensive database, called Sisagua. The Sisagua system allows an analysis through time on the reservoirs and its surroundings, and its enhancement makes it possible for the creation of an extraordinary management structure. With the quick, useful, and precise information flow, the system corroborates to an efficient hydric reservoir management. In order to give continuity, fill the gaps, enlarge the adopted approaches in evaluating and monitoring the bodies of water and bring innovation to technologies that support hydric resources management, Cemig's Water Quality Nucleus did many projects on Research and Development (P&D) throughout 2018. These are: developing of a photogrammetric algorithm to evaluate water quality, developing of ecological integrity methodology on marginal ponds and developing of ecotechnologies to diagnose environmental processes.

At last, due to its business nature, Cemig actively participates in a decision making collegiate and dedicated forums that discuss hydric resources and its issues. It also part-takes in every state and national hydric resources councils, watersheds committees, and working groups in its field, following and proposing adequate decisions to the electric sector, conciliating the multiple uses of watersheds.

With its business focused in Minas Gerais, Cemig is a member of 20 state and five national committees on watersheds. The company is also part of Abrage (Brazilian Association of Electric Producing Companies), having acted as the Hydric Resources Workgroup (GTRH) coordinator in 2018.

W11.1

(W11.1) Provide details for the person that has signed off (approved) your CDP water response.

	Job title	Corresponding job category
Row 1	Chief Executive Officer	Chief Executive Officer (CEO)

W11.2

(W11.2) Please indicate whether your organization agrees for CDP to transfer your publicly disclosed data on your impact and risk response strategies to the CEO Water Mandate's Water Action Hub [applies only to W2.1a (response to impacts), W4.2 and W4.2a (response to risks)].

No.