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# CDP Climate Change

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## 2015

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Companhia  
Energética de Minas  
Gerais



English Version

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## Introduction Module

### CC0.1 Introduction

Founded in 1952 by then Governor of Minas Gerais state, Juscelino Kubitschek de Oliveira, Companhia Energética de Minas Gerais (Cemig) provides the generation, transmission, commercialization and distribution of electricity, as well as providing energy solutions (Efficientia S.A.) and natural gas distribution (Gasmig). The group comprises: the holding company, Companhia Energética de Minas Gerais (Cemig); two wholly-owned subsidiaries, Cemig Geração e Transmissão S.A. (Cemig GT) and Cemig Distribuição S.A. (Cemig D), and a group of other entities, comprising an overall total of 206 companies, 18 consortia and two private equity funds, with assets in 23 Brazilian states (including the Federal District) and in Chile. Since its founding, the company has contributed, in an innovative and sustainable manner, to the collective welfare of the regions where it operates. Cemig is Brazil's largest electricity distributor in terms of the length of its transmission lines and extent of its networks, and one of the largest power generation and transmission companies in the country. It is also involved in natural gas exploration and distribution and data transmission operations (Cemig Telecom). Cemig owns a 26.06% stake in Light S.A., an electricity distributor with operations in 31 municipalities in the state of Rio de Janeiro, covering a region with a population of over 11 million people. It also has equity stakes in the transmission company Transmissora Aliança de Energia Elétrica S.A. (Taesa).

With a growth model increasingly focused on the use of renewable energy, between 2013 and 2014 Cemig became part of the controlling stockholding block (27.4%) of Renova, a leader in Brazil's wind power market, which also has investments in solar and other renewable energy sources. The main objective in joining Renova's controlling block was to use that company as Cemig's vehicle for expansion in renewable energy sources (except hydroelectric).

Cemig is a mixed capital company controlled by the State of Minas Gerais (51%), with (at December 2014) more than 120,000 shareholders in 40 countries. Its shares are traded in São Paulo on the BM&FBovespa S.A., in New York on the New York Stock Exchange (NYSE) and in Madrid on the Mercado de Valores Latino-Americanos (Latibex). In 2014 Cemig's consolidated net operating revenues totalled R\$ 19.54 billion, based on a matrix whose main source of energy are renewable resources.

Excluding power generated by Light, Cemig's generation system has installed capacity of 7,435 MW, 94.85% of which is for hydroelectric generation, 2.47% for thermal generation (1.76% burning fuel oil and 0.71% burning process waste gas), and 2.68% for wind generation. These figures make Cemig one of the largest power generators in Brazil – operating 63 hydroelectric power plants, three thermoelectric facilities, and four wind farms. Adding the generating capacity represented by Cemig's stakes in subsidiary and affiliated companies, such as Light, Cemig's installed generation capacity totals 7,717 MW. The company has 9,748 km of transmission lines and 17,218 km of sub-transmission lines. And in electricity distribution, it provides supply to

approximately 7.8 million people in 774 municipalities in Minas Gerais, managing Latin America's largest electricity distribution network, with distribution lines totalling more than 484,000 km. At the end of 2014 Cemig directly employed 7,922 people.

Because of its commitment to social and environmental responsibility, its economic and financial strength, and its technical excellence, Cemig has become an international benchmark in sustainability in the electricity sector, and is positioned as one of the main vectors for consolidation in the Brazilian electric sector. It has been included in the Dow Jones Sustainability Index (DJSI World) ever since that index was created 15 years ago; it has been a part of the BM&FBovespa's Corporate Sustainability Index (ISE) for the past 10 years; and last year was the fifth time that it has been selected for inclusion in the Carbon Efficient Index (ICO2), created by BM&FBovespa and the BNDES (National Bank for Development in 2010. In 2014, the CDP recognized Cemig as the leading company in Brazil in terms of its excellence in climate change information and transparency: of the 52 major Brazilian companies that responded to the annual questionnaire issued by this London-based non-profit NGO, Cemig obtained the highest marks for transparency, scoring 98 out of a total of 100.

#### MISSION

"To operate in the energy sector with profitability, quality and social responsibility."

#### VISION

"Consolidate itself in this decade as the largest group in the Brazilian electric energy industry in terms of market value, with operations in the gas market, world leader in sustainability, admired by its clients and recognized for its solidity and performance".

### **CC0.2 Reporting Year**

01/01/2013 to 12/31/2014

### **CC0.3 Country List Configuration**

Brazil

### **CC0.4 Currency**

BRL(R\$) – Reais

### **CC0.6 Modules**

Electric Utilities module

## Management Module

### CC1. Governance

#### CC1.1 Where is the highest level of direct responsibility for climate change within your organization?

Board of Directors, or an individual or group of people belonging to the Board of Directors, or other committee appointed by the Board of Directors.

*If the "Board of Directors or individual/group belonging to the Board or other committee appointed by the Board of Directors," "Senior Manager/Director," or "Other Manager/Director":*

##### **CC1.1a Please identify the position of the individual or name of the committee with this responsibility.**

The person at the highest level of direct responsibility for climate change issues in Cemig is the Deputy CEO, who reports directly to the CEO. The CEO is the highest instance of the Executive Board, which in turn reports directly to the Board of Directors.

Cemig's management comprises: its Board of Directors, and Executive Board. Members of the Board of Directors, who are elected at the Annual General Shareholder's Meeting, elect the firm's CEO and Deputy CEO, and appoint the Executive Board. The duties of the Deputy CEO, defined and approved by the Board of Directors, include: (i) replacing the CEO when s/he is absent, on leave, temporarily disabled, has resigned or the position is vacant; (ii) working towards the improvement of the Company's social responsibility and sustainability policies; (iii) defining policies and guidelines related to the environment, technological development, alternative energy sources and technical standardization; (iv) coordinating Cemig's strategy in relation to social responsibility, the environment, and technological processes for the strategic management of technology; (v) coordinating the implementation and maintenance of quality systems; (vi) implementing the Company's technological development programs, and (vii) monitoring the management of plans for compliance with environmental, technological and quality improvement guidelines.

#### CC1.2 Does your organization provide incentives for the management of climate change issues, including the attainment of targets?

Yes.

*If "Yes":*

**CC1.2a Please provide further details on the incentives provided for the management of climate change issues.**

Who is entitled to benefit from these incentives?	Type of incentive	Incentivized performance indicator	Comment
Board of Directors / Executive Board	Monetary reward	Other: Sustainability index related to climate change	<p>Indicator: Cemig's score in the Dow Jones Sustainability World Index. This index evaluates issues related to climate change, among other sustainability-related issues.</p> <p>The variable remuneration of the Deputy CEO is linked to Cemig's score in the Dow Jones Sustainability World Index. He is the second-ranked individual on the Executive Board, which is part of the Company's management.</p>
Director on the Board	Monetary reward	Efficiency target	<p>Indicator: Index of energy loss in the electricity system</p> <p>Energy losses in the electricity system are responsible for 99% of Cemig's Scope 2 emissions. To achieve the goal of reducing these measurable losses (i.e., Scope 2 emissions), the company established the Total Distribution Losses Index (IPTD), with multi-year targets validated annually and monitored monthly. The variable remuneration of the Distribution and Marketing Director and the staff of the Revenue Protection Unit is linked to this loss rate. It should be noted that a CO<sub>2</sub> emissions target cannot be established here, as the emissions factor of the interconnected system varies annually. Therefore, the target is defined in terms of MWh.</p>
Corporate executive team	Monetary reward	Other: Sustainability index related to climate change	<p>Indicator: Participation of Cemig in the portfolio of the Carbon Efficient Index (ICO<sub>2</sub>).</p> <p>Developed by the BM&amp;FBovespa and the Brazilian Development Bank (BNDES), the ICO<sub>2</sub> is an indicator based on the IBrX-50 portfolio, which takes into account, in the weighting of participating shares, the ratio between a company's gross revenues and its greenhouse gas (GHG) emissions, thus evaluating GHG emissions efficiency.</p> <p>The variable remuneration of the team that is subordinate to the Deputy CEO is linked to Cemig's participation in the ICO<sub>2</sub>.</p>
Corporate executive team	Monetary reward	Other: Sustainability index related to climate change	<p>Indicator: Cemig's score in the environmental dimension of the Dow Jones Sustainability World Index. This index evaluates issues related to climate change, among other questions related to sustainability.</p> <p>This team is also responsible for achieving Cemig's sustainability goals on all climate change-related matters directly linked to these goals.</p> <p>The variable remuneration of the team that is subordinate to the Deputy CEO is directly linked to Cemig's score in the environmental dimension of the Dow Jones Sustainability Index.</p>

## CC2. Strategy

**CC2.1 Please select the option that best describes your risk management procedures with regard to climate change risks and opportunities.**

Procedures are integrated into multi-disciplinary company-wide risk management processes.

*If you selected “Integrated into multi-disciplinary company-wide risk management processes” or “A specific climate change risk management process”:*

**CC2.1a Please provide further details on your risk management procedures with regard to climate change risks and opportunities.**

Frequency of monitoring	To whom are results reported?	Geographic areas considered	How far into the future are risks considered?	Comment
Semi-annually or more frequently	Board of Directors or individual/group belonging to the Board or other committee appointed by the Board of Directors	Brazil	> 6 years	<p>Cemig uses a tool for managing corporate risks that identifies strategic and process/operational risks, providing information to senior management for decision-making for managing the most relevant risks and, thereby, preserving the Company’s value.</p> <p>The Executive Board maintains a Risk Management Steering Committee, which is focused on the efficient management of Cemig’s operational, commercial, financial and regulatory risks — especially industry issues related to tariff adjustments and hydrological constraints.</p> <p>Strategic risks are related to the Company’s vision and objectives, or strategic decisions that bear the risk of not achieving planned outcomes.</p> <p>Process/operational risks arise in the course of business functions associated with people, systems and processes upon which their operations depend. Cemig has a decentralized structure for the identification and management of climate change-related opportunities, which focuses on renewable energy and energy efficiency.</p>

**CC2.1b Please describe how your risk and opportunity identification processes are applied at both company and asset level.**

Cemig considers strategic risks/opportunities to be those that can directly affect the company's business, in other words, are those associated with senior management decision-making that could materially affect the Company's economic value. Additionally, process risks/opportunities are considered to be those that can negatively or positively affect meeting the goals and implementing guidelines established in the Company's Strategic Plan, identified in all processes in each business division - Sales/Trading, Generation, Transmission, Distribution, and Corporate.

Therefore, Cemig treats corporate level risks/opportunities as strategic risks/opportunities. This extends to subsidiaries and individual plants (i.e., asset level), since they encompass both strategic and process risks/opportunities.

Cemig continuously maps risks/opportunities, since updating the information in the Company's management tool and monitoring and evaluating controls and action plans are part of the scheduled routines for all involved in risk management - meaning each agent has predetermined roles and responsibilities. This recently adopted tool raises the hierarchy level at which approval is required for the information gathered; previously, approval was at the Division (General Manager) level. Now, it is made at the Executive Board level.

In addition, the system enables risks/opportunities to be managed at the process level, which permits a direct link to risks under evaluation at the strategic level.

### **CC2.1c How do you prioritize the risks and opportunities identified?**

Cemig uses scales to classify risks and opportunities according to their financial impact, intangible impact, probability of occurrence and relevance to the Company. Percentage estimates between each of the points for each of the scales are given. From these scales, Cemig prioritizes each risk, allowing for a hierarchy of risks within a risks/opportunities exposure matrix, which includes risks/opportunities surveyed throughout the process.

In addition, specifically for the "financial impact", variable referenced above, which is used to define the position of a risk/opportunity in the exposure matrix, information regarding the financial implications of risks/opportunities, controls and measurements are fed into the system. The system then calculates the cost/return of an inherent risk/opportunity (i.e., without management action), the residual risk/opportunity (after the implementation of controls) and planned residual risk/opportunity (after the implementation of measures). This allows decision-making on priorities based on robust financial analyses of scenarios with and without the management of risks/opportunities.

In terms of opportunities, the major focus has been on the acquisition of renewable source assets. To this end, Cemig has adopted a structure for acquisitions through partnerships with strategic partners and investment funds. This establishes a growth



vehicle that allows the Company, even with a minority stake, to establish a strategic and competitive position with those assets, combining its expertise with the partners' financial capacity.

In mergers and acquisitions undertaken by Cemig, it is essential to carry out due diligence for evaluation, identification, measurement and management of each risk and contingency. It is a multidisciplinary activity and involves several knowledge areas – technical, environmental, legal, corporate, regulatory, real estate, accounting, tax, labour and financial. Thus, conducting due diligence is an indispensable tool for the investment as a Company's growth strategy.

## **CC2.2 Is climate change integrated into your business strategy?**

Yes.

*If "Yes":*

### **CC2.2a Please describe the process of how climate change is integrated into your business strategy and any outcomes of this process.**

- i. The Corporate Risk Monitoring Committee classifies and prioritizes risks and opportunities related to climate change according to exposure matrices and presents them to the Executive Board. These risk and opportunity assessments are thereby presented to senior management, which uses them to develop the Company's strategic plan. Once the Executive Board has defined and approved Cemig's strategy, the Company's other executive departments plan the activities. The Board of Directors conducts the Strategic Planning process with the participation of the Executive Board.

During the last annual cycle of Cemig's Strategic Planning process, the Board of Directors approved an update to the Corporate Strategic Plan, defining the strategic objectives over the short term and until 2035. The main drivers of Cemig's business strategy are related to balanced growth through new projects, as well as mergers and acquisitions, with the main commitment being to sustainable growth and adding shareholder value over the long term. In terms of the aim to expand installed capacity through a low-risk portfolio, the Company's expansion in renewable sources has been particularly noteworthy.

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

Development of low carbon businesses: Cemig has identified opportunities for business, and for achieving market advantages, arising from its low carbon energy matrix. These are led by: (i) use of Cemig's existing expertise to build

and renovate renewable power plants; and (ii) investment in new energy sources.

Regulatory changes: Cemig identifies regulatory risks related to climate change, which are considered seriously as part of the Company's strategic decision-making process. Cemig conducts environmental due diligence prior to the acquisition of new assets (assessment of carbon risk), to evaluate the possible financial impact of any increase in GHG emissions from such assets, vis-à-vis the possibilities for internalizing emission costs due to new regulations.

Need for climate change mitigation: Although Cemig's GHG emissions are already low, it strives to reduce them even further by establishing targets for reduction of emissions, electricity consumption and electricity losses.

Need for adaptation to climate change: Cemig has generating capacity that has low GHG-emission intensity because it is predominantly hydropower-based, but is subject to the consequences of climate change. Therefore, it invests in improving weather forecasting systems; in enhancing the infrastructure of its power plants, transmission lines and distribution network, to deal with these consequences; and in improving the forecasting of availability of water for its generation assets. Additionally, it has sought to diversify its matrix of sources by increases its participation in wind power generation, through Renova Energia. In 2014 was approved in the Aneel reserve auction the deployment of 106.9 MWp generation from photovoltaic source.

- iii. Strategy components influenced by climate change in the short term (up to 5 years): (i) Cemig invests in state-of-the-art techniques and equipment that provide a high degree of accuracy in forecasting intensity and location of storms. (ii) It has established a corporate goal of reducing Scope 1 GHG emissions by 8% (in tCO<sub>2</sub>e/MWh) from 2008 to 2015. (iii) It has set a corporate goal of reducing electricity losses to below 10.85% by 2017.
- iv. Strategy components influenced by climate change in the long term (over 10 years): The need to consolidate low carbon energy supply sources has guided R&D projects in technologies that Cemig could deploy on a large scale in the future, such as (i) development of the second edition of a Minas Gerais solarimetric atlas, and (ii) electricity generation in solar plants connected to the power grid. Cemig's recent acquisitions demonstrate its focus on expansion in renewable sources (see acquisitions in 2014 under item (vi) of this question). With these strategic actions, Cemig is expanding its power generation in the short term, and investing in a diversified matrix of renewable energy sources for the long term.

The climate change scenario opens new business opportunities for Cemig, with expectations of high demand over the long run. Cemig owns Efficientia S.A., which develops and implements technological solutions for efficient use of energy among non-residential consumers.

- v. By maintaining a predominantly renewable matrix and conducting carbon risk assessments, Cemig is able to take positions in advance of the risks associated with increased electricity generation costs.

At the same time, development of new technologies, especially solar generation, puts Cemig in the vanguard of the electricity industry – incorporating new technologies into its supply matrix and enabling it to diversify its businesses.

- vi. More substantial strategic decisions made by Cemig in 2014, which were influenced by business opportunities made more feasible as a result of climate change, include the following:

- Investment in electricity distribution network loss management: Loss control is one of Cemig's strategic goals. Among other effects it reduces the emissions factor of the national grid, with potential for mitigation of climate change effects.
- Activities that minimize physical risks from extreme weather events:
  - Improvement in distribution networks: Establishment of the Protected Distribution Network (Rede de Distribuição Protegida – RDP), with shielded lines and networks, and fully structured distribution line pathways, as a minimum standard for urban supply.
- Activities that increase opportunities for low carbon business development:
  - Acquisition of 27.4% of Renova and membership of its controlling stockholder block (a transaction begun in 2013 and completed in 2014).
  - Agreement with Renova for a 50% equity interest in the Zeus Project, for installation of 25 wind farms in the city of Jacobina, in the state of Bahia, with total installed capacity of 676.2 MW – with commercial supply to start in September 2018. Cemig's total direct and indirect ownership interest in Renova is 32.5%.
  - Contracting of 150.4 MW of installed capacity at the 2014 Reserve Supply Auction (the '2014 LER'), in three wind complexes (43.5 MW) and four solar farms (106.9 MWp), to start commercial supply in October 2017; and 108 MW of installed capacity in the 2014 A-5 Auction, in five wind farms for start of supply in January 2019. All of

these complexes are in the state of Bahia. Cemig's total direct and indirect ownership interest is 32.5%.

**CC2.2c Does your company use an internal price of carbon?**

Yes.

If "Yes":

**CC2.2d Please provide details and examples of how your company uses an internal price of carbon.**

- i. Scope of the emissions: Scope 1;
- ii. Rationale for employing a price: First, it is important to note that in Brazil there is no set price for carbon. However, when assessing the acquisition of projects using fossil fuels, Cemig carries out internal analyses of carbon risk and its financial impact on the Company (i.e., the potential financial risk to the Company in a potential future scenario for GHG emissions pricing in Brazil). In its most recent assessment the Company considered different power generation scenarios in the Brazilian energy matrix. To calculate the financial impact of carbon pricing on these projects, Cemig determined the energy to be generated from and the GHG emissions that would be produced by each scenario; then, the GHG emissions were multiplied by the domestic price of carbon. The results were included in the financial feasibility analysis of each project and were incorporated as operating costs. These assessments were based on the average prices of Verified Carbon Standard (VCS) credits;
- iii. Actual price used: The value used in the carbon pricing of fossil fuel-using projects that might be acquired is the mean value of annual averages of Verified Carbon Units (VCUs), which is currently equivalent to R\$ 3.56.
- iv. Variations in price over time and across geographic areas: These were not considered.
- v. Person/entity responsible for determining this price: For each assessment, Cemig contracts a firm that specializes in carrying out carbon risk assessments, which is responsible for determining the price of carbon, according to the methodology described in items (ii) and (iii) above.
- vi. An example of how carbon pricing affects investment decisions: Cemig conducts environmental due diligence and sensitivity analyses in the acquisition of new fossil-fuel using assets (carbon risk assessment) to evaluate the potential financial impact of increases in its GHG emissions from these assets,

including the possibility of internalizing emission costs as a result of new regulations. This helps the Company make decisions regarding business expansion.

**CC2.3 Do you engage in activities that could either directly or indirectly influence public policy on climate change through any of the following?**

- Direct engagement with policy makers
- Trade associations
- Financing research organizations
- Other
- No

*If "Direct engagement with policy makers" is ticked:*

**CC2.3a On what issues have you been engaging directly with policy makers?**

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Other: mitigating and adapting to climate change	Support	<p>Created in 1977 as the Environmental Policy Commission, the State Environmental Policy Board (Conselho Estadual de Política Ambiental - COPAM) became the State Council of Minas Gerais in 1987, and currently has the status and function of a regulatory and advisory decision-making committee, subordinated to the State Department for Environment and Sustainable Development (Secretaria de Estado de Meio Ambiente e Desenvolvimento Sustentável - SEMAD). It delivers decisions regarding guidelines, policies, regulations and technical norms, standards and other operational measures to preserve the environment and environmental resources, and their application by SEMAD through entities linked to the council, and other regional and local environmental regulation agencies.</p> <p>Among the Thematic Boards that comprise COPAM is the Energy and Climate Change Chamber (Câmara de Energia e Mudanças Climáticas - CEM), on which Cemig has a representative.</p> <p>In 2014, the Minas Gerais Energy and Climate Change Plan (Plano de Energia e Mudanças Climáticas de Minas Gerais - PEMC) was presented to the CEM. The PEMC is a cross-referenced planning tool covering all socio-economic sectors of the state of Minas Gerais that impact GHG emissions and/or suffer the effects of climate change. The plan is a public policy instrument that was created through a participatory process, its main objective being to establish guidelines and activities for mitigation and adaption to climate change in Minas Gerais, while ensuring the state's transition to a low carbon economy and its sustainable development.</p>	Cemig supports this legislation without reservations.

If “Trade associations” is ticked:

**CC2.3b Are you on the Board of any trade associations or provide funding beyond membership?**

Yes.

If “Yes”:

**CC2.3c Please enter the details of those trade associations that are likely to take a position on climate change legislation.**

Trade association	Is your position on climate change consistent with theirs?	Please explain the trade association’s position	How have you, or are you attempting to, influence the position
<p>Brazilian Business Council for Sustainable Development (Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável – CEBDS)</p>	<p>Consistent</p>	<p>Cemig sits on the CEBDS’s Energy and Climate Change Chamber (Câmara Temática de Energia e Mudanças do Clima -CTClima). CTClima represents the views of the CEBDS’s member companies on issues related to climate change, in debates, and in formulation of public policies together with governments and other interest groups. CTClima’s mission is “to provide a suitable forum for companies to understand their role in relation to climate change, assisting them to develop strategies that take advantage of opportunities, minimize risks, and prepare for a world with restrictions on greenhouse gas emissions.”</p> <p>The CEBDS is involved in various activities associated with this issue that could contribute to the development and improvement of public policies on the subject. For example, in 2014 CEBDS launched the third edition of a carbon value chain management project that has trained more than 250 suppliers to prepare their own greenhouse gas inventories since 2012. The project’s goal is to prepare the supply chain for possible regulatory changes on the subject, to achieve a positive emission reduction result while ensuring business continuity without a loss in market competitiveness.</p>	<p>Cemig’s representative on the Energy and Climate Change Chamber (CTClima) participates in its meetings, discussions and debates and, when applicable, contributes with suggestions for the formulation of public policies.</p>

If “Funding research organizations” is ticked:

**CC2.3d Do you publicly disclose a list of all the research organizations that you fund?**

Yes<sup>1</sup>.

**CC2.3e Do you fund any research organizations to produce or disseminate public work on climate change?**

<sup>1</sup>Cemig publishes all the research projects it conducts, organised by subject; the details of the projects are available at: [http://www.cemig.com.br/en-us/Company\\_and\\_Future/innovation/Research\\_and\\_Development/Pages/research\\_and\\_development.aspx](http://www.cemig.com.br/en-us/Company_and_Future/innovation/Research_and_Development/Pages/research_and_development.aspx)

Yes.

If "Yes":

**CC2.3f Please describe the work and how it aligns with your own strategy on climate change.**

Cemig's Research and Development (R&D) Program produces processes, new methodologies, software, materials, devices and equipment to improve the electricity system and help the Company adapt to and mitigate the impacts caused by climate change, thereby benefiting the electricity industry, Cemig, and society. Cemig has focused on studying energy alternatives, directing efforts toward development of new ways forward for technology and business options in the sector. Following are details of some of our 2014 projects:

- Photovoltaic Power Plants at Universities: Conclusion of a partnership with four universities in Minas Gerais for the installation of four photovoltaic plants, each with nominal capacity of 12.5 KWp. Cemig provides technical support for their operations and maintenance, and donated 1,000 photovoltaic modules. Each plant will generate an average of approximately 18 MWh/year and, in addition to the economic benefit of the surplus power generated, will offer educational options for vocational training and development of photovoltaic technology.
- Sete Lagoas Solar Photovoltaic Plant: Continuing construction of an experimental, 3.3 MWp capacity photovoltaic plant in Sete Lagoas, in partnership with the company Sebra Solaria Brasil, the Federal University of Minas Gerais and the Minas Gerais State Research Foundation (Fundação de Amparo à Pesquisa do Estado de Minas Gerais - Fapemig). The project aims to develop the necessary expertise for commercial photovoltaic power generation, the project will operate a photovoltaic plant coupled and a sophisticated solar energy research centre.
- Sustainable Electricity Generation from Effluents of Charcoal Production in the Pig Iron Production Chain: This is the continuation of a project in partnership with the Federal University of Ouro Preto and Ondatec Tecnologia Industrial em Microondas, aiming to generate electricity from the effluents produced by vegetable biomass pyrolysis, considerably reducing the pollution potential and increasing the energy efficiency of charcoal production. The prototypes have been built and are being adjusted; liquid and gaseous fuels are undergoing testing, and it is expected that it will be possible to use them for electricity production;
- Solid Urban Waste Gasification for Electricity Generation: This is a partnership with the Federal University of Itajubá and AG Therm Caldeiras e Equipamentos,



to build a pilot plant for fluidized bed gasification of fuels derived from urban solid waste biomass, lowering the environmental impact of disposal of this type of waste in the region. The equipment is being purchased and installed, and modelling of the system is in progress.

- Use of gases from wood carbonization in charcoal production: This project in partnership with ArcelorMittal BioFlorestas was finalized in 2014, to develop and build systems for transport of carbonization gas and for recovery of forest biomass waste, to generate electricity in a system comprising a central burner, an externally-fired gas-turbine (EFGT) and a generator. Prototypes were assembled, equipment installed, followed by experimental testing and validation of results. Following a technical inspection by Cemig an End-of-Project Workshop was held, open to the general public and the scientific community. The project produced a doctoral dissertation defended in 2014 at the Federal University of Viçosa (UFV), entitled “The Potential of Electricity Generation from Wood Carbonization Forest Residues and Gases.” A master’s degree thesis inspired by the project is expected in 2016, and several articles resulting from the project are being prepared for publication. A patent application is also being prepared.
- Power generation using biogas from vinasse digestion: This project in partnership with Methanum Engenharia Ambiental, and Efficientia, was finalized in 2014, to develop a system to purify biogas from vinasse, for use to generate electricity. There was trial operation of the system in 2014 and the project ended with the Closing Workshop, open to the general public and the scientific community, which attracted approximately 50 people. The initiative inspired academic research: in 2015, a master’s degree thesis, “Analysis of the microbial community in a system for the treatment of biogas with high concentrations of sulphide,” was defended at the Federal University of Minas Gerais; and a doctoral dissertation, “Desulfurization of biogas from the methanization of vinasse: a new approach for the removal of high concentrations of H<sub>2</sub>S”, is scheduled for 2015. Articles have been submitted for publication, and a patent application has been prepared.

Investments in these lines of research are made as part of the R&D program regulated by Brazil’s National Electric Energy Agency (Agência Nacional de Energia Elétrica - Aneel), and in partnership with Fapemig.

*If “Direct engagement”, “Trade associations”, “Funding research organizations” or “Other” is ticked:*



**CC2.3h What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?**

Cemig's institutional relationships with the makers of public policy on climate change are conducted, under the approval of the Executive Board, by the Heads of Divisions (General Managers) charged with the management of specific strategic goals and corporate risks associated with the subject. Their work undergoes an annual recycling process as part of the Company's annual strategy and Strategic Plan cycle. As described in question CC1.1, the individual directly responsible for Cemig's global climate change strategy is the Deputy CEO. Thus, following approval by the Chief Officers of the related divisions, the Deputy CEO's team ultimately evaluates all direct and indirect public policy development activities in which the Company participates. As an underlying premise, all institutional activities are driven by assumptions contained in the Cemig document "10 initiatives for the climate."

**CC2.4 Would your organization's board of directors support an international agreement between governments on climate change, which seeks to limit global temperature rise to under two degree Celsius from pre-industrial levels in line with IPCC scenarios such as RCP2.6?**

The Company has no opinion on the subject.

## CC3 Targets and Initiatives

**CC3.1 Did you have an emissions reduction target that was active (ongoing or reached completion) in the reporting year?**

- ( ) Absolute target  
 ( ) Intensity target  
 (x) Absolute and intensity targets  
 ( ) No

*If you have an “Absolute target” or “Absolute and intensity targets”:*

**CC3.1a Please provide details of your absolute target.**

Target identification	Scope	% of emissions in scope	% reduction from base year	Base year	Base year emissions (tCO <sub>2</sub> e)	Target year	Comments
Abs-1	Scope 2	0.8%	4%	2011	6,351	2020	<p>The Company has established a goal of reducing the combined electricity consumption of Cemig GT and Cemig D by 4% from 2011 to 2020.</p> <p>In 2011, Cemig GT and D consumed 46,876 MWh of electricity, representing 0.8% of the Company’s Scope 2 emissions in the year (the other 99.2% was due primarily to electrical losses, plus a small portion arising from electricity consumption by Efficientia and Cemig Telecom).</p> <p>That year, the national grid emission factor was 0.0292 tCO<sub>2</sub>/MWh, so that emissions associated with electricity consumption were 1,368 tCO<sub>2</sub>. However, to allow comparison with emissions from electricity consumption in 2014, the base year emissions have been reported (in the column on the left) using the 2014 national grid emission factor, which was 0.1355 tCO<sub>2</sub>/MWh, resulting in a value of 6,351 tCO<sub>2</sub>.</p> <p>Note that the Scope 2 emission factor is given for emission factors developed by using the coefficient of fossil fuel use in electricity for Brazil’s National Grid system, primarily through thermoelectric plant activities.</p> <p>This emission factor is used to calculate emissions from electricity generation acquired from the national grid (Scope 2), which in 2014 was 0.1355 tCO<sub>2</sub>/MWh (as above), calculated from data collected by the Brazil’s National Electric System Operator (ONS) using a procedure developed in partnership with the Brazilian Science, Technology and Innovation Ministry (MCTI). The methodology adopted is the “<i>Tool to calculate emission factor for an electricity system,</i>” approved by the United</p>

										Nations Framework Convention on Climate Change (UNFCCC).
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If you have an “Intensity target” or “Absolute and intensity targets”:

**CC3.1b Please provide details of your intensity target.**

Target identification	Scope	% of emissions in scope	% reduction from base year	Metric	Base year	Base year emissions standard (tCO <sub>2</sub> e/MWh)	Target year	Comments
Int-1	Scope 1	100%	8%	tCO <sub>2</sub> e/MWh	2008	0.007801	2015	This target refers to reduction of Scope 1 emissions in relation to electricity generated by Cemig; thus it is expressed as tCO <sub>2</sub> e/MWh produced.

If you have an “Intensity target” or “Absolute and intensity targets”:

**CC3.1c Please also indicate what change in absolute emissions this intensity target reflects.**

Target identification	Direction of change anticipated in absolute Scope 1 + 2 emissions at target completion?	% change anticipated in absolute Scope 1 + 2 emissions	Direction of change anticipated in absolute Scope 3 emissions at target completion?	% change anticipated in absolute Scope 3 emissions	Comments
Int-1	Increase	14.08%	–	–	Despite the reduction of GHG emissions per MWh produced by Cemig when the target was achieved, the Company is projecting an expansion of its production of approximately 124% from 2008 to 2015, which will lead to an increase in absolute Scope 1 emissions, while achieving established target.  By 2015, there may be an increase in absolute emissions due to increased operation of the Igarapé Thermoelectric Power Plant.

For both types of target, also:

**CC3.1d For all of your targets, please provide details on the progress made in the reporting year.**

Target identification	% complete (time)	% complete (emissions)	Comments
Abs-1	33.33%	100%	In 2014, Cemig GT and Cemig D consumed 44,168 MWh of electricity, 5.78% less than in 2011 (target base year). Thus Cemig has reached and exceeded its target of reducing its electricity consumption by 4% compared to 2011.
Int-1	85.71%	0.00%	<p>Scope 1 emissions have increased since 2008 emissions to 0.023467 tCO<sub>2</sub>e/MWh generated by Cemig. Thus, in 2014, Cemig has not improved in its goal of reducing emissions of 0.007801 (base year) to 0.007177 tCO<sub>2</sub>e/MWh in 2015 (8% reduction compared to 2008).</p> <p>Scope 1 emissions have increased since 2013 due to emissions from Cemig's thermoelectric power plants, which produced 96.9% of Scope 1 emissions. The <i>Igarapé</i> power plant, with installed capacity of 131 MW, operates to meet contingency needs within the Brazilian electricity system. In 2014, it was in operation for 6,541 hours, as compared to 1,653 hours in 2013. This increase led to higher GHG emissions by <i>Igarapé</i> (up from 130,985 tCO<sub>2</sub>e in 2013 to 577,922 tCO<sub>2</sub>e in 2014). The decision to dispatch power for Brazil's electrical system is made by the National Electric System Operator (Operador Nacional do Sistema Elétrico - ONS), based on analysis of forecasts of future scenarios for water flows available to hydroelectric plants, forecast growth in power consumption, and the timetable for building of new power plants. In periods of favourable rainfall and high levels of water storage in reservoirs, decisions to dispatch generation from thermoelectric plants are minimized, as hydropower generation is prioritized. In moments of unfavourable rainfall and lower storage levels, or even at times when increased non-hydroelectric output is desired as a factor to ensure supply of the market due to generation expansion construction program uncertainties, the ONS tends to increase thermal output to reduce hydroelectric generation, to ensure sustained water storage levels in the hydropower reservoir system.</p> <p>The <i>Barreiro</i> thermal plant, located on the premises of steel products manufacturer Vallourec, generates electricity from steelmaking process gases, but in 2014 consumed natural gas due to reduced industrial production by Vallourec. Consumption of natural gas by the <i>Barreiro</i> plant was responsible for the emission of 21,316 tCO<sub>2</sub>e, or 3.5% of Scope 1 emissions.</p>

**CC3.2 Does the use of your goods and/or services directly enable GHG emissions to be avoided by a third party?**

Yes.

If "Yes":

**CC3.2a Please provide details of how the use of your goods and/or services directly enable GHG emissions to be avoided by a third party.**

Renewable energy generation: Over 97% of Cemig's installed power generation capacity is derived from renewable sources. When generating renewable energy, Cemig is replacing power generation that otherwise would likely have come from fossil sources.

- i. This initiative enables Scope 2 reduction by all consumers connected to the national grid.
- ii. By injecting energy from renewable sources into the national grid, Cemig is strengthening a reduction of the system's emission factor, which benefits all power consumers connected to that system. In 2014, 25,253 GWh of energy was generated from renewable sources (hydro + wind).
- iii. It is estimated that renewable power generation in 2014 prevented emission of 3.421 million tCO<sub>2</sub>.
- iv. It is assumed that Cemig's renewable power generation precluded power generation from thermal sources in the Brazilian grid system. To calculate emission reductions, we used the national grid emission factor for 2014, calculated for GHG inventories by the Science, Technology and Innovation Ministry (MCTI), multiplied by the amount of electricity generated from renewable sources.
- v. Generation of Certified Emission Reductions (CERs) under the Clean Development Mechanism (CDM) involved 11 projects, for expected total reduction of 1,072,113 tCO<sub>2</sub>e.

Efficientia S.A. is a wholly-owned subsidiary of Cemig which develops and implements energy efficiency and power cogeneration projects, and offers consulting services to optimize the energy mix of industrial companies.

- i. This enables non-Cemig parties to reduce Scope 2 emissions, since it reduces consumption by its clients of electricity from the national grid.
- ii. In 2014 works were completed on the Santa Vitória thermal plant, a cogeneration facility with installed capacity of 20 MW fuelled by sugarcane bagasse.

Efficientia signed new contracts in 2014 to implement projects for lighting system modernization, and photovoltaic power generation.

- iii. It is estimated that the contracts signed in 2014 will result in emissions reductions of 117.26 tCO<sub>2</sub>/year;
- iv. It is estimated the contracts signed in 2014 will also result in reduction of electricity consumption totalling 309 MWh/year and reduction in power generation of 556.5 MWh/year. To calculate emission reductions, we used the

national grid emission factor for 2014, calculated for GHG inventories by the Science, Technology and Innovation Ministry (Ministério de Ciência, Tecnologia e Inovação - MCTI)<sup>2</sup>, multiplied by the amount of electricity saved and generated.

- v. Generation of Certified Emission Reductions (CERs) under the Clean Development Mechanism (CDM) was not considered for any of these projects implemented.

Gasmig: This Cemig subsidiary, which is exclusive distributor of piped natural gas throughout Minas Gerais, has developed the Inovagás project, which offers energy efficient solutions to customers.

- i. This initiative helps to reduce Scope 1 emissions by non-Cemig parties, as it allows them the option of consuming a fuel with a lower GHG emission factor.

In 2014, Gasmig built 64.84 km of pipelines in the Belo Horizonte metropolitan area, in the southern state of Minas Gerais (Sul de Minas), the Steel Valley region (Vale do Aço) and the city of Juiz de Fora, to serve needs of commercial and industrial consumers.

- ii. Gasmig brings natural gas infrastructure to strategic areas of the state, allowing more carbon-intensive fossil fuels to be replaced in manufacturing industries.
- iii. In 2014, consumption of Gasmig-distributed natural gas avoided the emission of 1,105,629 tCO<sub>2</sub>e.
- iv. Gasmig monitors the amount of natural gas it supplies to the industries it serves. In 2014 Gasmig sold 1.531 billion m<sup>3</sup> of gas. The emission reduction estimate was based on the assumption that in the absence of natural gas distribution, industry (corresponding to 67.89% of natural gas consumed in 2013) would consume fuel oil, vehicles (2.36%) would consume gasoline, thermoelectric power plants (29.17%) would use diesel, and general purpose consumers (commercial, residential, cogeneration and generation – 0.58%) would use diesel or fuel oil from a stationary source. Using the emission factors, and the lower calorific values and densities of the Brazil GHG Protocol, emissions were calculated based on the use of natural gas (real world scenario), and – the baseline scenario – based on the use of fuel oil, gasoline and diesel. The figure for ‘emissions avoided’ is the result of subtracting one from the other.
- v. Gasmig did not take into account the generation of Certified Emission Reductions (CERs) under the Clean Development Mechanism (CDM).

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<sup>2</sup> GHG emission factors for the Brazilian National Grid System for the inventory of these gases. Available at: <http://www.mct.gov.br/index.php/content/view/321144.html#ancora>.

**CC3.3 Did you have emissions reduction initiatives that were active within the reporting year (this can include those in the planning and/or implementation phases)?**

Yes.

*If “Yes”, complete questions CC3.3a, CC3.3b and CC3.3c:*

**CC3.3a Please identify the total number of projects at each stage of development, and for those in the implementation stages, the estimated CO<sub>2</sub>e savings.**

Stage of development	Number of projects	Total estimated annual CO <sub>2</sub> e savings in metric tonnes CO <sub>2</sub> e (only for rows marked*)
Under investigation	591	–
To be implemented*	98	1,278,279
Implementation commenced*	5	1,502
Implemented*	3	5,451
Will not be implemented	0	–

**CC3.3b For those initiatives implemented in the reporting year, please provide details in the table below.**

Activity type	Description of activity	Estimated annual CO <sub>2</sub> e savings (metric tonnes of CO <sub>2</sub> e)	Scope	Voluntary/ Mandatory	Annual monetary savings (R\$)	Investment required (R\$)	Payback period	Estimated lifetime of the initiative (years)	Comments
Energy efficiency: Processes	<p>Nature of the activity: Includes initiatives focused on reducing technical electricity losses in the distribution system. These losses are inherent in electricity transmission through equipment, transmission lines and distribution. Included among actions taken in 2014 to control and minimize technical losses are:</p> <ul style="list-style-type: none"> <li>• Medium voltage reactive compensation project: Preparation of a reactive compensation plan for the installation of 225 automatic capacitor banks by 2016, with an anticipated investment of R\$ 9.0 million and a reduction of technical losses accounting for R\$ 4.2 million/year (which corresponds to 23.6 GWh/year).</li> <li>• Strengthening the medium voltage/low voltage electrical system and expanding/strengthening the high voltage (69 kV to 230 kV) sub-transmission system.</li> <li>• Completion of the installation in the electrical system of 385 banks of fixed capacitors.</li> <li>• Acquisition and installation of amorphous core technology distribution transformers, which</li> </ul>	3,197	Scope 2	Voluntary	9.3 million	31.6 million	3 years	16-20 years	-



	<p>reduce no load losses by approximately 80%, and strengthen the respective low voltage circuits.</p> <p>Other specific actions include: investigations of new grid technologies and conductors; studies to increase the operating efficiency of the electrical system (circuit reconfiguration); and establishment of criteria for limitation of technical loss levels in low and medium voltage circuits.</p> <p>The Company's Scope 2 emissions are reduced (emissions associated with technical electricity losses are recorded under Scope 2 in Cemig's inventory; losses are considered as power consumption because the emissions are required to generate this electricity).</p> <p>In relation to external regulators, this initiative is voluntary. In relation to technical losses, the 10.48% target was established by the Brazilian electricity regulator (Aneel), which makes it a mandatory goal for Cemig. However, the initiatives described here have been adopted voluntarily by the Company to achieve this goal.</p>								
Low carbon energy installation	<p>Nature of the activity: In July 2014, commercial operations began at fourteen (14) wind farms of Renova (294.4 MW). Also, on October 13, 2014, Aneel published its Order No. 4,108 of October 10, 2014, approving the start of commercial operations at six (6) Renova wind farms contracted at the 2010 reserve energy auction (LER). As of October 11, 2014, the energy from these facilities, with a total installed capacity of 167.7 MW, began to be recorded as per the terms of the commercial contract between Renova and Brazil's Electrical Energy Trading Chamber (CCEE).</p> <p>Only 27.4% of the reductions of emissions associated with the implementation of Renova</p>	271	Scope 1	Voluntary	Confidential information	Confidential information	Confidential information	16-20 years	-

	<p>wind farms in 2014 were considered in the scope of Cemig's CDP report, as Cemig's ownership interest in Renova is 27.4%. Cemig's Scope 1 emissions have been reduced as a result of expansion of its generation from low carbon plants. Thus, Cemig has reduced its Scope 1 emissions per MWh produced (to calculate these emission reductions, whose result is in the next column, we used the Scope 1 tCO<sub>2</sub>e emission factor per MWh produced by Cemig in 2013 and published in its 2014 CDP report, equal to 0,005737 tCO<sub>2</sub>e / MWh produced). If we were to consider Scope 2 emissions reductions by Cemig's consumers, using the emission factor of the Brazilian electrical system for the inventory, the resulting emissions reduction would be 92,369 tCO<sub>2</sub>e (the emissions reduction in the column on the right are for Cemig's Scope 1).</p> <p>In relation to external regulators, this initiative is voluntary.</p>								
Transport: Fleet	<p>Nature of the activity: In 2014, Cemig's fleet consumed 798,946 litres of fuel. This represented a reduction that was mainly due to Cemig's fleet management practices, which, since 2010, have optimized the vehicle fleet through the Company's "Fleet replacement program." This represented a saving of approximately R\$ 860,000. Fleet optimization during this period was possible because all vehicles replaced since 2010 came installed with an Electronic Management System. From 2010 to 2014, this tool has allowed for vehicle use to be constantly monitored, which enabled a reduction of 584 units in this period.</p> <p>Scope 1 emissions of the company have been reduced due to the reduction of fossil fuel use in fleet vehicles. In relation to external regulators, this initiative is voluntary.</p>	1,983	Scope 1	Voluntary	860,000	4.3 million	4-10 years	5 years	-

**CC3.3c What methods do you use to drive investment in emissions reduction activities?**

Method	Comments
Compliance with regulatory requirements / standards	Federal Law 9,991/2000 requires 1% of the organization's net operational revenues to be invested in R&D funding and energy efficiency programs. Thus, Cemig created the Intelligent Energy (Energia Inteligente – EI) program, focused on energy efficiency. It involves several multi-year socio-environmental projects to develop energy efficiency opportunities in low-income communities (in compliance with Article 1, section V included by Law 12,212/2010 in Law 9,991/2000) and in non-profit and philanthropic institutions.
Financial optimization calculations	Cemig incorporates GHG emission parameters in the preliminary evaluation of the technical and economic feasibility of a new project, taking into account potential financial gains from the sale of carbon credits. This assessment has helped Cemig decide whether or not to implement projects shown to be eligible for the Clean Development Mechanism (CDM).
Internal finance mechanisms	The Company's fleet replacement is funded through its Investment Programs. Cemig's guidelines call for annual vehicle fleet renewal so that the average age of vehicles does not exceed five years, the legal depreciation period established by the concession-granting authority.
Dedicated budget for R&D in low-carbon products	Cemig's Research and Development (R&D) Program encourages the constant quest for innovation to meet the power sector's technological challenges. In this context, Law 9,991/2000 requires holders of electricity distribution, generation and transmission concessions and permissions to invest part of each year's net operational revenues through the Electricity Sector Research and Development Program, regulated by Aneel.  To ensure implementation of this requirement, each year Cemig issues tenders for projects in various fields of research. Among projects related to climate change are: Alternative energy sources; distributed and decentralized generation; thermal generation and energy efficiency; water basin management and energy planning; metering, billing and commercial losses; and the environment.
Dedicated budget for other emission reduction initiatives	Funds are set aside within the Distributor Development Program (PDD) for reduction of Cemig's electrical system losses, and for an emission reduction initiative to reduce both its own and the national grid's emissions.
Internal price of carbon	Cemig uses environmental due diligence and sensitivity analyses to assess the risk of increased carbon emissions in its energy mix and the financial impact of such increases to help it decide on acquiring new expansion projects.

## CC4. Communications

**CC4.1 Have you published information about your organization’s response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).**

Publication	Status	Page/ Section reference	Attach the Document
The CDSB model has not yet been used for the principal financial report – the <i>Annual and Sustainability Report</i> (available on the Company’s website).	Complete	Page 113 / Environment section Climate Change sub-section	<a href="http://2014report.cemig.com.br/">http://2014report.cemig.com.br/</a>
In other reports required by legislation	Complete	Form 20F: Page 70 / “The Carbon Market” section	<a href="http://cemig.infoinvest.com.br/enu/12506/Form%2020F%202014_SE C.pdf">http://cemig.infoinvest.com.br/enu/12506/Form%2020F%202014_SE C.pdf</a>
In voluntary communications	Complete	Throughout the document (GHG Emissions Inventory)	<a href="http://www.cemig.com.br/en-us/Company_and_Future/Sustainability/Programs/climate_changes/Documents/CEMIG_GHG_INVENTORY_2014%20ingl%C3%AAs.pdf">http://www.cemig.com.br/en-us/Company_and_Future/Sustainability/Programs/climate_changes/Documents/CEMIG_GHG_INVENTORY_2014%20ingl%C3%AAs.pdf</a>

## Risks and Opportunities Module

### CC5. Climate Change Risks

**CC5.1 Has the company identified any inherent climate change risks that have the potential to generate a substantive change in your business operations, revenue or expenditure?**

- (x) Risks driven by changes in regulation
- (x) Risks driven by changes in physical climate parameters
- (x) Risks driven by changes in other climate-related developments

**CC5.1a Describe the inherent risks to the company driven by changes in regulations.**

Risk driver	Description	Potential impact	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact	Estimated financial implications of the risk before taking action	Methods you are using to manage this risk	Costs associated with these actions
General environmental regulations, including planning	Through the National Climate Change Policy, the Brazilian government has set a voluntary target to reduce Brazil's GHG emissions from between 36.1% and 38.9% of projected GHGs for 2020. The risk associated with this commitment is an increase in operating costs due to possible Electricity Sector Agreements, mainly related to the creation of a tax on carbon emissions.	Increased operating costs	> 6 years	Direct	Probable	Low to average	Less than 1% of net operational revenues	<p>Management methods include setting goals to reduce GHG emissions and, for new acquisitions, evaluation of carbon risk through due diligence, immediately minimizing probability and magnitude of the risk.</p> <p>Cemig has sought opportunities to increase power generation using renewable energy, minimizing the magnitude of risk over the five-year time horizon.</p>	<p>Less than R\$ 400,000.</p> <p>Costs are annual and related to maintaining the environmental team, and will continue as long as the risk persists</p>

Carbon taxation	Despite its low-carbon energy matrix, Cemig operates a fossil fuel thermal power plant whose operations could be affected if a carbon tax is enacted in Brazil. This tax also is a risk if Cemig expands its fossil fuel thermal electricity generation business in the future.	Increased operating costs	> 6 years	Direct	As likely as it is unlikely	Low - average	Less than 1% of net operational revenues	Cemig evaluates carbon risk through due diligence, registering corporate GHG emissions through the inventory of the company's emissions, and sets targets for reducing GHG emission intensity. We expect these actions will reduce the magnitude of the risk to the company when new regulations are implemented.	Less than R\$ 400,000. Costs are yearly and associated with maintaining the environmental team of the thermal plant, and conducting the company's emission inventories. The costs will exist as long as the risk persists.
Cap-and-trade arrangements	Establishment of a GHG emissions market of the cap-and-trade type in Brazil might result in a need for greater planning by Cemig on compliance with specific market regulations, especially emissions monitoring and verification.	Increased operating costs	> 6 years	Direct	As likely as it is unlikely	Low - average	Less than R\$ 2 million	Cemig employs professionals with qualification and training in identifying carbon credit generation projects and has long-term contracts with testing and certification companies, thereby already reducing the probability that this risk will materialize. Cemig already has registered CDM emissions reduction projects with the UNFCCC.	Less than R\$ 300,000. The costs are those related to monitoring and audits required for validation and sale or trading of credits. The costs are not annual, and occur only when audits are conducted.

<p>Uncertainty about new regulations</p>	<p>To inventory its GHG emissions, Cemig uses the ISO 14064-1 and the GHG Protocol standards to ensure data collection reliability. If an emissions trading market, carbon tax or other tools to reduce emissions were established, the adoption of other methodologies and standards may be required in preparing corporate inventories. Thus, Cemig may have to adjust its current procedures, already well established, to comply with new regulations that may be adopted.</p>	<p>Increase in operating costs</p>	<p>1 – 3 years</p>	<p>Direct</p>	<p>Unlikely</p>	<p>Low</p>	<p>Less than R\$ 100,000.00</p>	<p>To produce an inventory of its GHG emissions, Cemig uses the ISO 14064-1 and GHG Protocol standards to ensure data collection reliability, as well as having a third party validate the data. These actions are designed to reduce the magnitude of risks and the probability that they will materialize.</p>	<p>Less than R\$ 50,000.  The costs associated with this activity are annual and related to conducting an emissions inventory and a third party audit. These costs will continue as long as the company continues to prepare an emissions inventory that is verified by third parties.</p>
<p>Other regulatory risks</p>	<p>The Mining and Energy Ministry has published a National Energy Efficiency Plan (PNEF) to propose measures to promote energy efficiency in the country. It uses the National Climate Change Plan as one of its benchmarks, with the mitigation of climate change as one of its goals.  The PNEF adopts the target of 10% reduction of electricity from 2003</p>	<p>Reduction in demand for goods and services</p>	<p>1 to 3 years</p>	<p>Direct</p>	<p>More likely than not</p>	<p>Low - average</p>	<p>Less than R\$ 10 million</p>	<p>Cemig monitors legal discussions, both at the federal and state and municipal levels. It also encourages residential and industrial energy efficiency programs, described in the <i>Annual and Sustainability Report</i>.</p>	<p>In 2014, we invested R\$ 35.5 million. The costs are related to investments in energy efficiency programs.</p>



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**CC5.1b Describe the inherent risks to the company driven by change in physical climate parameters.**

Risk driver	Description	Potential Impact	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact	Estimated financial implications of the risk before taking action	Methods you are using to manage this risk	Costs associated with these actions
Changes in precipitation and drought extremes	Unfavourable hydrology conditions at the national level reduce Brazil's hydroelectric generation. Consequently, companies cannot meet 100% of the volumes established in the physical guarantee contracts. This means the National System Operator (ONS) must resort to thermal plants to meet part of the domestic demand. The greater the water shortage in the nation's reservoirs, the higher the cost for Brazilian companies, which must buy energy on the spot market to meet contractual obligations. The impact of this risk will	Reduction / disruption in production capacity	< 2 years	Direct	As likely as unlikely	High	Less than 20% of Cemig's total costs	Cemig maintains a specific organizational structure dedicated entirely to the issue which provides support to the decisions of the Company's risk management committees.  The Overall Risk Management Committee (CDGR) has the mission of dealing efficiently with corporate risks involving operational, commercial, financial and regulatory aspects for the Cemig group of companies, particularly in an industry scenario	Less than R\$ 2 million.  Costs are annual, and associated with maintaining the teams. The costs will continue while the risk persists.

	<p>depend on the marketing and risk management strategy adopted by Cemig.</p>						<p>featuring tariff adjustments and hydrological constraints.</p> <p>It also has an Energy Risk Management Committee (CGRE) designed to minimize the risks of power purchase and sale contracts, primarily for transactions in the wholesale and the free market. Thus, the magnitude of the impact of this is diminished.</p> <p>Cemig also participates in the Energy Reallocation Mechanism, the purpose of which is to share hydrological risks: plants with high flows and hence high generation transfer power to plants with low flows. This sharing system gives the ONS (National System Operator) greater flexibility for dispatching plants</p>	
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								and ensures compliance with Cemig's energy sales commitments, contributing to a lower probability of impact. Cemig's management methods also help reduce the magnitude of this impact.	
Changes in precipitation and drought extremes	Climate changes may cause undesirable impacts to reservoirs due to silting, which could occur faster or (in an optimistic scenario) more slowly, depending on how the change in rainfall and hydrological levels occur at each reservoir. This could reduce reservoir useful life and boost maintenance costs.	Reduction / disturbance in productive capacity	> 6 years	Direct	Unlikely	Average	Less than 0.5% of net operational revenues	<p>Cemig closely monitors reservoir silting in a number of ways, including: mapping changes in the shape of reservoir beds due to sedimentary deposits; monitoring reduction in volume of reservoirs; studies of reservoir useful life; and sedimentation volume monitoring.</p> <p>Cemig also participates in the Energy Reallocation Mechanism to share</p>	<p>Less than R\$ 2 million.</p> <p>These are annual costs and are associated with the maintenance of the equipment and the meteorology, dam security and risk management teams, in addition to the investments in R&amp;D and new sources of alternative generation of energy. These costs will continue as long as the risk continues.</p>

								hydrological risk: plants with high water flows and generation transfer energy to plants with low water flows. This sharing system enables the ONS (National System Operator) to be more flexible in dispatching. It also ensures Cemig's compliance with energy sales commitments by helping reduce the probability of adverse effects.	
Changes in average temperatures	Climate change may cause an increase in average temperatures and alteration of rainfall and drought patterns, indirectly leading to increased risks to the Power Transmission System because prolonged drought conditions maximize fire risk. Fires within or near transmission line pathways could cause transmission line unavailability.	Reduction / disruption in production capacity	> 6 years	Direct	As likely as they are unlikely	High	Less than 1 % of net operational revenues	Cemig continuously inspects for and clears brush from transmission line pathways to maximize safety and assure line availability.	Less than R\$ 2 million. Costs are annual and associated with the process of clearing line pathways.
Changes in precipitation and	Excessive rainfall can cause structural problems in dams,	Reduction / disruption	> 6 years	Direct	Very unlikely	High	Less than 1% of net operational	The annual dam safety monitoring cycle consists of	Less than R\$ 2 million.

drought extremes	resulting in generation not being available.	in production capacity						revenues	field inspections, collection and analysis of instrumentation data, planning and monitoring of maintenance services, results analysis and inspection of civil structures. The vulnerability of each dam is calculated automatically and continuously and monitored by the 'Inspetor' Dam Control and Monitoring and Safety System, which was developed in an R&D project. It incorporates georeferencing and deterioration tools, enabling comprehensive analysis of the behaviour of each dam. Cemig was a pioneer in Brazil in the preparation of emergency plans for dam breaks, having started studying the subject in 2003. Specific emergency plans are currently	Costs are annual and associated with maintenance of equipment and continued employment of meteorology, dam safety and risk management teams, and also R&D on alternative electricity generation.  These costs will continue as long as the risk persists.
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								available for each dam. These actions are currently underway and contribute to reducing the likelihood of this risk in the short term.	
Changes in precipitation and drought extremes	Heavy rainfall over a short period, accompanied by high winds and lightning, can cause physical damage to power distribution facilities, leading to their unavailability. This can increase Cemig's costs, due to compensation of consumers for power supply interruptions. These phenomena increasingly are associated with the effects of unfavourable microclimates, typical of large urban centres.	Reduction / disruption in production capacity	< 1 year	Direct	Highly likely	High	Less than 1% of net operational revenues	Cemig's management methods seek to reduce the magnitude of this risk in the medium term. It calls for preventive measures, such as pruning urban trees; operation of weather stations and radar that provide more precise data on the occurrence and intensity of storms; and an emergency plan assigning maintenance crews to quickly restore power.	Less than R\$ 2 million.  Costs are annual and associated with maintaining the teams that contain this type of risk.

**CC5.1c Describe the risks to the company driven by changes in other factors related to climate.**

Risk driver	Description	Potential Impact	Time frame	Direct / Indirect	Likelihood	Magnitude of impact	Estimated financial implications of the risk before taking action	Methods you are using to manage this risk	Costs associated with these actions
Change in consumer behaviour	Consumers can reduce their consumption of electricity through discussions of climate change mitigation incentive programs through other sources of energy: substitution of electric heating, such as solar heating for residential water.	Reduction in demand for goods and services	> 6 years	Direct	Unlikely	Average	Cemig does not know the potential financial implications of the possible change in behaviour	Because Cemig does not know the potential financial implications of the possible change in behaviour, no methods were devised to manage this risk.	Because Cemig does not know the potential financial implications of the possible change in behaviour, no methods were devised to manage this risk.
Change in consumer behaviour	High temperatures can lead to greater electricity consumption and overloading of the electricity distribution system in the more sensitive areas in Minas Gerais, and may reduce the supply of power to consumers in the region.	Reduction / disruption in production capacity	<1 year	Direct	As likely as it is unlikely	High	Less than 1% of net operational revenue	This risk is managed by: <ul style="list-style-type: none"> <li>- Diagnosing the electrical system to access the need for expansion;</li> <li>- Monitoring operating conditions;</li> <li>- Restructuring project priorities.</li> </ul> These actions will help reduce the probability and magnitude of the impact in the short term.	Less than R\$ 400,000. Annual costs are for maintaining a team for the planned actions for minimizing the risk of blackouts in the distribution system. These costs will continue while the risk persists.
Reputation	If Cemig has to increase its energy supply by using fossil	Stock price reduction (market)	> 6 years	Direct	Unlikely	Average	Less than 1% of operating	One of the methodologies that Cemig uses	Less than R\$ 1 million.

	fuel thermal plants, it may be criticized by society, impacting brand value.	value)					revenue	to assess its image and reputation with its stakeholders regarding its role in climate change is to evaluate the general public's esteem, admiration, trust and empathy toward the company through the RepTrak™ Deep Dive methodology. The process creates an overall index of the company's reputation. In 2011, a Brand and Reputation Committee was formed to examine the actions to be taken to improve the company's performance on this issue. This approach enables Cemig to reduce the probability and magnitude of this risk, if it occurs, in the short term.	It is associated with the cost of contracting the brand value research. This cost will continue so long as the research is needed.
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## **CC6. Climate Change Opportunities**

**CC6.1 Have you identified any inherent climate change opportunities that have the potential to generate a substantive change in your business operations, revenue or expenditure?**

- (x) Opportunities driven by changes in regulation
- (x) Opportunities driven by changes in physical climate parameters
- (x) Opportunities driven by changes in other climate-related developments

**CC6.1a Describe the inherent opportunities that are driven by changes in regulation.**

Opportunity driver	Description	Potential Impact	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact	Estimated financial implications of the opportunity before taking action	Methods you are using to manage this opportunity	Costs associated with these actions
International Agreements	Compliance with regulatory requirements and the emergence of new international agreements may create opportunities for Cemig, because it has an energy matrix of predominantly renewable and low-carbon sources, and appears more prepared than its competitors to adapt to this scenario. The establishment of a cap-and-trade-type emissions trading market in Brazil or internationally in the CDM model, for example, might lead Cemig to become a major supplier of emission reduction certificates. This could lead to revenue-increasing opportunities for Cemig.	Premium prices for product sales	> 6 years	Direct	Most likely	Average	Less than 1% of net operational revenues	Cemig has professionals trained to identify carbon credit generating projects and has long-term contracts with testing and certification companies, thus raising the possibility of taking advantage of this opportunity. Cemig already has established CDM emission reduction projects, registered with the UNFCCC.	Less than R\$ 1 million.  The costs are related to monitoring and audits required for validation and sale or trading of credits. The costs are not annual and occur only when audits are conducted.

Emission reporting requirements	The current Cemig generation matrix is heavily based on renewable resources. The existence of emissions reporting requirements will bring Cemig's energy matrix of low GHG emissions into evidence, which may attract more investors to the company, as well as enhance its reputation.	Increased stock price (market value)	> 6 years	Direct	As likely as it is unlikely	Low	Less than 1% of net operational revenues	Cemig prepares its GHG inventory annually, available on the website of the company – that is to say the Company is well prepared for dealing with this opportunity.	Less than R\$ 50,000.  The annual costs are related to the preparation of the emission inventory and third party audit. This cost will occur whenever the emissions inventory audit is carried out.
Product labelling regulations and standards	If regulations are established that reward the acquisition of renewable (green) energy, Cemig will benefit by already having a renewable matrix that is recognized as a strategic distinguishing characteristic.	Premium values for product sales	> 6 years	Direct	Likely	Low	Less than 1% of net operational revenues	The energy trading area together with the sustainability area have been monitoring green energy marketing possibilities. Cemig will take advantage of all the real possibilities identified.	Less than R\$10 million.  The estimated costs are for certification of renewable energy when the subject is regulated in Brazil (in the future).
Other: regulatory opportunities	In order to increase the supply of low emissions electricity in the Brazilian electrical system, the government may establish more attractive financing lines for renewable energy.  For example, lower spreads could	Reduction in capital costs	1 - 3 years	Straight	Likely	Low	The financial analysis has not been done to date.	Because Cemig does not know the possible financial implications, methods of managing this opportunity have not been established.	Because Cemig does not know the possible financial implications, methods of managing this opportunity have not been established.

	provide an opportunity for reduction of capital costs for the Company.								
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**CC6.1b Describe the inherent opportunities that are driven by changes in physical climate parameters.**

Opportunity driver	Description	Potential impact	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact	Estimated financial implications of the opportunity before taking action	Methods you are using to manage this opportunity	Costs associated with these actions
Changes in precipitation extremes and droughts	The 4th IPCC report identifies possible scenarios of change in world rainfall patterns and indicates that in the Southeast region of Brazil, where the majority of Cemig's reservoirs are located and in the South region, there may be variations between stable and increased water availability. As a result, Cemig may request an increase in physical guarantees, especially for its Small Hydro Power Plants (SHPs).	Increased production capacity	> 6 years	Direct	As likely as it is unlikely	High	Less than 1% of net operational revenues	Cemig has experts in meteorology and hydrology who, by using mathematical models, can estimate future rainfall and water flows. Operation of plants is optimized based on the current availability and projections of future availability.  The Hydrometeorological Telemetry System (STH) has 168 stations for real time collection of weather and hydrological data	Less than R\$ 1 million.  Costs are annual and associated with equipment maintenance and weather teams. These costs will continue while the risk persists.

								at strategic locations in the state of Minas Gerais. With STH, Cemig has constant access to updated rainfall, river and reservoir level data, enabling advantage to be taken of fluctuations in water availability to generate electricity.	
Changes in average temperature	Probable higher average temperatures will cause changes in consumption patterns – such as increased use of ventilation and cooling systems – resulting in increased energy demand. The study by Rodriguez <i>et al.</i> (2013) examined the possible impact of climate change on residential electricity demand, from projections of increasing quarterly average temperatures according to the GHG emissions scenario in the IPCC Report. The results suggest that residential demand for electricity in Brazil could increase in	Increased demand for existing products / services	> 6 years	Direct	As likely as it is unlikely	High	Less than 1% of net operational revenues	In order to prepare for the increased electricity demand, Cemig has been increasing the availability of electricity distribution infrastructure to serve the growth of this market by reinforcing substations, distribution networks and lines.	Less than R\$ 400,000. Costs are annual and associated with maintaining the team responsible for carrying out the planned actions to minimize the risk of blackouts in the electricity distribution system.

response to the projected increases in temperature.								
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**CC6.1c Describe the inherent opportunities that are driven by changes in other factors related to climate.**

Opportunity driver	Description	Potential impact	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact	Estimated financial implications of the opportunity before taking action	Methods you are using to manage this opportunity	Costs associated with these actions
Other opportunities	<p>The power generated by biomass has not only been able to supply energy for industrial consumption, but sale of a surplus in the government's New Energy auctions.</p> <p>According to the Energy Expansion Ten-Year Plan to 2023, released by the Mining and Energy Ministry, the inclusion of biomass cogeneration has proven to be a competitive alternative in the Brazilian electricity market. But there is still great potential to be</p>	Increased demand for existing products / services	1 - 3 years	Direct	Most likely	Low	Less than 1% of net operational revenues	<p>Efficientia manages this project and focuses on optimization of project results and meeting the budgeted deadlines and cost limitations.</p> <p>Efficientia's projects follow the basic concepts of PMBOK and the International Measurement and Results Verification Protocol.</p> <p>This structure has enabled Cemig to be prepared to boost the magnitude of this opportunity, even in the short term.</p>	<p>Less than R\$ 500,000.</p> <p>Costs are annual and associated with the maintenance of Efficientia's staff.</p>

	explored. Cemig, through its wholly owned subsidiary <i>Efficientia</i> , develops projects for cogeneration using waste from industrial processes, through performance contracts, thus identifying one more opportunity to increase its revenue.								
Other opportunities	In a corporate scenario of increasing corporate investments in energy efficiency to reduce electricity consumption and GHG emissions, there could be increased demand for the services of Cemig's subsidiary <i>Efficientia</i> , including installation of energy-saving lighting projects using LED technology. These projects are carried out under performance contracts, through which <i>Efficientia</i> invests the necessary funds and recovers its investment from savings achieved in	Increased demand for existing products / services	1 - 3 years	Direct	Most likely	Low	Less than 1% of net operational revenues	<p><i>Efficientia</i> manages this project and focuses on optimization of project results and meeting the budgeted deadlines and cost limitations.</p> <p><i>Efficientia</i>'s projects follow the basic concepts of PMBOK and the International Measurement and Results Verification Protocol.</p> <p>This structure enables Cemig be prepared to increase the magnitude of this opportunity even in the short term.</p>	<p>Less than R\$ 500,000.</p> <p>Costs are annual and associated with the maintenance of <i>Efficientia</i>'s staff.</p>

	the project.								
Other opportunities	<p>Efficiency in use of electricity is an important factor in meeting demand, contributing to energy security: it fosters power supply security, competitiveness of the economy and reduction of GHG emissions. In the reduction in demand from the consumer side, Efficientia, a wholly owned Cemig subsidiary, is positioned in the market as a provider of energy solutions – including implementation of photovoltaic energy, especially in industrial facilities. These projects are implemented under performance contracts through which Efficientia makes the investment of required funds and recovers its investment from savings achieved by the project.</p>	<p>Increased demand for existing products / services</p>	<p>1 - 3 years</p>	<p>Direct</p>	<p>Most likely</p>	<p>Low</p>	<p>Less than 1% of net operational revenues</p>	<p>Efficientia manages this project and focuses on optimization of project results and meeting the budgeted deadlines and cost limitations.</p> <p>Efficientia's projects follow the basic concepts of PMBOK and the International Measurement and Results Verification Protocol.</p> <p>This structure enables Cemig be prepared to increase the magnitude of this opportunity even in the short term.</p>	<p>Less than R\$ 500,000.</p> <p>Costs are annual and associated with the maintenance of Efficientia's staff.</p>
Reputation	<p>In a low-carbon energy market, Cemig has a good</p>	<p>Increase in the share price (market</p>	<p>1 - 3 years</p>	<p>Direct</p>	<p>Very likely</p>	<p>Average</p>	<p>Less than 1% of net operational</p>	<p>One of the methodologies that Cemig uses</p>	<p>Less than R\$ 1 million.</p>



	reputation with its stakeholders due to its renewable matrix and alternative energy and energy efficiency R&D programs. In a climate change scenario, these features will help boost the value of its brand.	cap)					revenues	to assess its image and reputation with stakeholders in relation to its role on climate change is by evaluating the general public's degree of esteem, admiration, trust and empathy through the RepTrak™ Deep Dive methodology. This process creates an overall index of the company's reputation. The Brand and Reputation Committee was formed in 2011 to examine the actions to be taken to improve the Company's performance on this issue. Cemig is in a position to reduce the probability and magnitude of this risk, if it occurs, in the short term.	Costs are annual and associated with company brand value research.
Other opportunities	If there are increases in corporate investments in energy efficiency to	Increased demand for existing products / services	1 - 3 years	Direct	Most likely	Low	Less than R\$ 1 million	Efficientia is a wholly owned subsidiary Cemig subsidiary that has operated	Less than R\$ 500,000.  The costs

	<p>reduce electricity consumption and as a result reduce GHG emissions, there could be an increase in demand for the services of Cemig's subsidiary <i>Efficientia</i>.</p>							<p>since 2002 to implement energy efficiency projects for Cemig's clients. It provides advisory services and technical and financial feasibility studies of energy efficiency projects, implementing cogeneration projects. It offers consulting services to optimize the energy mix and for ISO 50001 energy efficiency certification. Cemig is therefore prepared to take advantage of this opportunity if and when it appears.</p>	<p>are annual and represent the expense of maintaining the Efficientia team. This cost will continue as long as this opportunity exists.</p>
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# Emissions Module

## CC7. Emissions Methodology

**Base year:**

2008.

**CC7.1 Please provide your base year and base year emissions (Scopes 1 and 2).**

Scope	Base year	Base year emissions (metric tonnes of CO <sub>2</sub> e)
Scope 1	1/1/2008 to 12/31/2008	261,155
Scope 2	1/1/2008 to 12/31/2008	282,439

**CC7.2 Please give the name of the standard, protocol or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.**

- Brazil GHG Protocol Program
- IPCC Guidelines for National Greenhouse Gas Inventories, 2006
- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

**CC7.3 Please give the source for the global warming potentials you have used.**

Gas (global warming potential)	Reference
CO <sub>2</sub> (1)	IPCC Fourth Assessment Report (AR4 - 100 years)
CH <sub>4</sub> (25)	
N <sub>2</sub> O (298)	
SF <sub>6</sub> (22,800)	

**CC7.4 Please give the emissions factors you have applied and their origin; alternatively, please attach an Excel spreadsheet with this data at the bottom of this page.**

Fuel / Material / Energy	Emission Factor	Unit	Reference
Liquefied petroleum gas (LPG)	2.93502	tCO <sub>2</sub> e per tonne	Brazil GHG Program
Natural gas	0.00207	tCO <sub>2</sub> e per m <sup>3</sup>	Brazil GHG Program

Lighting kerosene	3.14177	tCO <sub>2</sub> e per tonne	Brazil GHG Program
Other: Diesel oil (stationary combustion)	0.00264	tCO <sub>2</sub> e per litre	Brazil GHG Program
Other: Pure automotive gasoline (stationary combustion)	0.00225	tCO <sub>2</sub> e per litre	Brazil GHG Program
Other: Anhydrous ethanol (stationary combustion)	0.00155	tCO <sub>2</sub> e per litre	Brazil GHG Program
Other: Biodiesel B100 (stationary combustion)	0.00236	tCO <sub>2</sub> e per litre	Brazil GHG Program
Residual fuel oil	3.02473	tCO <sub>2</sub> e per tonne	Brazil GHG Program
Aviation gasoline	0.00225	tCO <sub>2</sub> e per litre	Brazil GHG Program
Other: Gasoline C (road transportation)	0.00176	tCO <sub>2</sub> e per litre	Brazil GHG Program
Other: Ethanol (road transportation)	0.00256	kgCO <sub>2</sub> per litre	Brazil GHG Program
Other: Diesel oil (road transportation)	0.00255	tCO <sub>2</sub> e per litre	Brazil GHG Program
Other: Gasoline (waterway transportation)	0.00237	tCO <sub>2</sub> e per litre	Brazil GHG Program
Other: Airplane travel	0.11872 (long) 0.10376 (average) 0.18183 (short)	Other: kgCO <sub>2</sub> per passenger per km	Brazil GHG Program
Electricity	0.1355	tCO <sub>2</sub> per MWh	MCTI, Brazil

## CC8. Emissions Data

**CC8.1 Please select the boundary you are using for your Scope 1 and 2 greenhouse gas inventory.**

Operational control

**CC8.2 Please provide your gross global Scope 1 emissions figures in metric tonnes CO<sub>2</sub>e.**

617,717 tCO<sub>2</sub>e.

**CC8.3 Please provide your gross global Scope 2 emissions figures in metric tonnes CO<sub>2</sub>e.**

858,014 tCO<sub>2</sub>e.

**CC8.4 Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?**

No.

**CC8.5 Please estimate the level of uncertainty of the total gross global Scope 1 and 2 emissions figures that you have supplied and specify the sources of uncertainty in your data gathering, handling and calculations.**

Scope	Uncertainty range	Main sources of uncertainty	Please expand on the uncertainty in your data
1	+/- 3.5% (greater than 2% and less than or equal to 5%)	Lack of Data  Data management	Emission sources that were classified as "low assurance" are (i) consumption of LPG (liquefied petroleum gas) by forklifts and (ii) use of fertilizers. Both sources have low uncertainty associated with the emission factors used, equal to +/- 5.0%, but have high uncertainty associated with activity data, with values of +/- 15.0%.
2	+/- 5.1% (more than 5% and less than or equal to 10%)	Other: Estimation of the emission factor	Activity data have low associated uncertainty of +/- 1.0%. The emission factor used has also low associated uncertainty, equal to +/- 5.0%, and the Ministry of Science, Technology & Innovation calculated this factor.

**CC8.6 Please indicate the verification/assurance status that applies to your reported Scope 1 emissions**

Third party verification or assurance complete

*If Scope 1 emissions have been subject to third party verification or assurance (complete or underway):*

**CC8.6a Please provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.**

Type of verification or assurance	Attach the statement	Page/section reference	Relevant standard	Proportion of reported Scope 1 emissions verified (%)
Reasonable assurance	<i>GHGEmissionsCemig2014_Verification_TemplateCDP</i>	Entire document	ISO14064-3	100%

**CC8.7 Please indicate the verification/assurance status that applies to your reported Scope 2 emissions**

Third party verification or assurance complete

*If Scope 2 emissions have been subject to third party verification or assurance (complete or underway):*

**CC8.7a Please provide further details of the verification/assurance undertaken for your Scope 2 emissions, and attach the relevant statements.**

Type of verification or assurance	Attach the statement	Page/section reference	Relevant standard	Proportion of reported Scope 2 emissions verified (%)
Reasonable assurance	<i>GHGEmissionsCemig2014_Verification_TemplateCDP</i>	Entire document	ISO14064-3	100%

**CC8.8 Please identify if any data points have been verified as part of the third party verification work undertaken, other than the verification of emissions figures reported in CC8.6, CC8.7 and CC14.2.**

Additional data points verified	Comment
No additional data were verified	-

**CC8.9 Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?**

No. In 2014 emissions from biomass combustion totalled 1,561 tCO<sub>2</sub>e, of which 1,013 tCO<sub>2</sub>e in Scope 1 and 548 tCO<sub>2</sub>e in Scope 3.

## CC9. Scope 1 Emissions Breakdown

### CC9.1 Do you have Scope 1 emissions sources in more than one country?

No.

### CC9.2 Please indicate which other Scope 1 emissions breakdowns you are able to provide.

By business division

By facility

By GHG type

By activity

By legal structure

### CC9.2a Please break down your total gross global Scope 1 emissions by Business Division.

Business Division	Scope 1 emissions (metric tonnes CO <sub>2</sub> e)
Cemig GT	583,426
Cemig D	12,744
Rosal Energia	21
Sá Carvalho	4
Efficientia	3
Ipatinga S.A. Thermal Plant	0
Barreiro S.A. Thermal Plant	21,316
Cemig Telecomunicações S.A.	202

### CC9.2c Please break down your total gross global Scope 1 emissions by type of GHG.

GHG type	Scope 1 emissions (metric tonnes CO <sub>2</sub> e)
CO <sub>2</sub>	595,839
CH <sub>4</sub>	5,775
N <sub>2</sub> O	9,573
SF <sub>6</sub>	6,530



**CC9.2d Please break down your total gross global Scope 1 emissions by activity.**

<b>Activity</b>	<b>Scope 1 emissions (metric tonnes CO<sub>2</sub>e)</b>
Stationary combustion	599,399
Mobile combustion	11,687
Fugitive emissions	6,530
Fertilizer consumption	101

## CC10. Scope 2 Emissions Breakdown

### CC10.1 Do you have Scope 2 emissions sources in more than one country?

No.

### CC10.2 Please indicate which other Scope 2 emissions breakdowns you are able to provide.

By business division

By facility

By activity

By legal structure

### CC10.2a Please break down your total gross global Scope 2 emissions by business division.

Business Division	Scope 2 emissions (metric tonnes CO <sub>2</sub> e)
Cemig GT	893
Cemig D	856,197
Rosal Energia	0
Sá Carvalho	0
Efficientia	0
Ipatinga S.A. Thermal Plant	0
Barreiro S.A. Thermal Plant	0
Cemig Telecomunicações S.A.	924

### CC10.2c Please break down your total gross global Scope 2 emissions by activity.

Activity	Scope 2 emissions (metric tonnes CO <sub>2</sub> e)
Purchased electricity	6,908
System technical losses	851,106

## CC11. Energy

**CC11.1** What percentage of your total operational spend in the reporting year was on energy?

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

**CC11.2** Please state how much fuel, electricity, heat, steam, and cooling in MWh your organization has purchased and consumed during the reporting year.

Energy type	MWh
Fuel	2,287,236
Electricity	50,985*
Heat	0
Steam	0
Cooling	0

\* This figure does not include technical and non-technical losses of electricity in the electrical system (which in 2014 amounted to 6,282,000 MWh), since the guidelines for this question request that they include only electricity purchased and consumed by Cemig (those produced by the company itself and consumed should not be counted). However, in Scope 2, emissions due to these electricity losses are counted.

**CC11.3** Please complete the table by breaking down the total “Fuel” figure entered above by fuel type.

Fuel	MWh
Biodiesel (B100)	1,938.37
Liquefied petroleum gas (LPG)	298.08
Dry natural gas	105,458.53
Automotive gasoline	8,809.14
Aviation gasoline	1,999.10
Residual fuel oil	2,130,159.69
Diesel oil	34,566.04
Other: Anhydrous ethanol	2,031.68
Other: Hydrous ethanol	15.49

**CC11.4** Please provide details of the electricity, heat, steam or cooling amounts that were accounted at a low carbon emission factor in the Scope 2 figure reported in CC8.3.

Basis for applying a low carbon emission factor	MWh associated with low carbon electricity, heat, steam or cooling	Comments
Low-carbon electricity	0	Only 4.1% of the electricity generated by

<p>generation connected to the electric system, whose plant is owned by the company, but without certification tools created for this electricity</p>		<p>Cemig does not come from a low-carbon power plant (this non low-carbon electricity is generated by the <i>Igarapé</i> thermal plant from fuel oil; in addition, in 2014 the electricity generated by the <i>Barreiro</i> thermal plant could not be considered low-carbon since this plant, located within Vallourec's industrial area to generate electricity from process gases, consumed natural gas for its operation in 2014 due to the reduction of Vallourec's output). Thus, 95.9% of our electricity is generated from hydro and wind power plants; in 2014, these plants exported 25,252,937 MWh of green energy to the Brazilian grid. As already mentioned, these plants are connected to the electrical system, but the electricity has not been certified for low emissions.</p> <p>This volume of electricity is exported to the grid not having been consumed by the company, and therefore the emissions it generates cannot be ascribed to Cemig. Thus, since this electricity generation does not enter Cemig's Scope 2 emission calculations, the value entered in the centre column is zero. All electricity consumed by Cemig in the reporting year was counted as purchased in the electricity system, and the national grid emission factor was used for its GHG emissions inventory.</p>
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## CC12. Emissions Performance

### CC12.1 How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to the previous year?

They increased.

*If emissions have "Increased", "Decreased" or remained the same overall:*

#### CC12.1a Please identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined) and for each of them specify how your emissions compare to the previous year.

Reason	Emissions value (percentage)	Direction of change	Comment
Emissions reduction activities	0.71%	Reduced emissions	Opportunities for optimizing logistics through better transportation management led to a reduction of 1,983 tCO <sub>2</sub> e in 2014. Also in 2014, management of electricity technical losses was responsible for cutting emissions by 3,197 tCO <sub>2</sub> e. Additionally, the startup of Renova wind farms allowed Scope 1 emissions reduction of 271 tCO <sub>2</sub> e. These initiatives are detailed in question CC3.3b. Total annual emissions were reduced by 5,451 tCO <sub>2</sub> e.
Divestment	0.00%	No change	Cemig made no divestments of business in the year that altered Scope 1 or 2 emissions within the inventory limits.
Acquisitions	0.00%	No change	Cemig made no business acquisitions that altered Scope 1 or 2 emissions within the inventory limits.
Mergers	0.00%	No change	Cemig made no mergers that altered Scope 1 or 2 emissions within the inventory limits.
Change in output	54.78%	Increased emissions	Emissions associated with operation of the <i>Igarapé</i> thermal plant in 2014 totalled 577,458 tCO <sub>2</sub> e; in 2013, these emissions totalled 130,693 tCO <sub>2</sub> e. The increase of operations accounted for a 58.36% increase of Scope 1 + 2 emissions in 2014, compared to 2013.  Cemig's electricity production decreased from 27,299.470 GWh in 2013 to 26,323.243 GWh in 2014. If all other conditions were to remain unchanged between the two years and assuming a linear reduction of emissions by reducing the generation of electricity, this decrease in production would lead to a 3.58% reduction of Scope 1 + 2 emissions.  These two factors taken together led to a 54.78% increase from 2013 to 2014.
Change in methodology	32.73%	Increased emissions	Increase in Scope 2 emissions due to a higher emission factor for the National Grid, which increased from 0.0960 tCO <sub>2</sub> e/MWh in 2013 to 0.1355 tCO <sub>2</sub> e/MWh in 2014, with Scope 2 emissions in 2013 representing 79.54% of Scope 1 + 2 emissions.
Change in boundary	0.00%	No change	There was no change in inventory boundaries of Scope 1 and 2 emissions.
Change in physical operating	0.00%	No change	There were no changes in the physical operating conditions of Cemig in terms of changes in Scope 1 and 2 emissions from 2013 to 2014.

conditions			
Unidentified	5.96%	Increased emissions	The 5.96% increase in Scope 1 + 2 emissions from 2013 to 2014 cannot be properly tracked; and as a result no causes were identified. All other items in this table together represented an 86.80% upsurge in emissions, with a total increase of 92.76%.
Other	0.00%	No change	No other changes in Cemig's operations were assessed from the perspective of changes in Scope 1 or 2 emissions from 2013 to 2014.

**CC12.2 Please describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tonnes CO<sub>2</sub>e per unit currency total revenue.**

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reasons for change
0.0000755236	mtCO <sub>2</sub> e	Net operational revenue (R\$)	87.10%	Increase	This increase in emissions per unit of revenue from 2013 to 2014 resulted mainly from more Scope 1 and 2 emissions in 2014. It was caused principally by the higher Brazilian power system GHG emission factor and the surge in electricity generation by the Igarapé Thermal Plant, which uses fuel oil as an energy source (and over which Cemig has no control, since the dispatch of electricity in the system depends on the decisions of the ONS - Grid National Operator).  Cemig's net operational revenue increased 3.03% in this period.

**CC12.3 Please describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tonnes CO<sub>2</sub>e per full time equivalent (FTE) employee.**

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reasons for change
186.2826306488	mtCO <sub>2</sub> e	Full-time employees	92.76%	Increase	This increase in emissions per full time equivalent employee from 2013 to 2014 was due mostly to the increase in Scope 1 and 2 emissions in 2014. It was caused principally by the higher Brazilian power system GHG emission factor and the surge in electricity generation by the Igarapé Thermal Plant, which uses fuel oil as an energy source (and over which Cemig has no control, since the dispatch of electricity in the system depends on the decisions of the ONS

					- Grid National Operator). The number of employees was unchanged from 2013 and 2014, at 7,922.
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**CC12.4 Please provide an additional intensity (normalized) metric that is appropriate to your business operations.**

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reasons for change
0.0560618994	mtCO <sub>2</sub> e	Other: MWh produced	99.91%	Increase	The increase in emissions from electricity produced by Cemig from 2013 to 2014 is mostly from an increase in Scope 1 and 2 emissions in 2014. This mainly was due to the Brazilian electrical system's GHG emission factor higher and a surge in electricity generation by the <i>Igarapé</i> Thermal Plant, which uses fuel oil as its energy source (and over which Cemig has no control, since the dispatch of electricity in the system depends on decisions made by the Grid National Operator - ONS). Also, electricity production in 2014 was lower by 3.58%.

## **CC13. Emissions Trading**

### **CC13.1 Does the company participate in any emissions trading schemes?**

No, but the company anticipates doing so in the next two years.

*If the answer is “Yes” or “No, but the company anticipates doing so in the next two years”:*

#### **CC13.1b What is the company’s strategy for complying with the schemes in which you participate or anticipate participating?**

Recent international negotiations have greatly impacted the carbon market. In December 2012, the first Kyoto Protocol commitment period ended and it was decided the agreement would be renewed during the Conference of the Parties, although configured differently. The agreement ended up losing a lot of its force, the value of the credits declined substantially and, currently, it is not so advantageous to enrol projects in the program. The unstable international economic climate contributed to a reduction in the productivity of the industrial companies, including carbon-intensive ones and, consequently, reduced demand for carbon credits.

Cemig has 12 projects registered under the Kyoto Protocol's Clean Development Mechanism (CDM), through which a total reduction of 5,087,309 tCO<sub>2</sub>e is expected. Despite the current uncertainty about the value of its credits under the Kyoto Protocol, these projects show that Cemig has implemented voluntary and additional actions to reduce emissions and, therefore, is preparing for a possible scenario involving participation in an emissions trading scheme.

At the national level, the National Climate Change Policy (PNMC) establishes that the Brazilian Emissions Reduction Market (MBRE) is to be one of the instruments to reduce GHG emissions. While this market still is not a reality, it is expected to emerge in the near future. The PNMC does not set sectorial targets; rather, it states that to achieve the voluntary target set by Law 12,187/2009 of reducing Brazil's projected emissions by between 36.1% and 38.9% by 2020, actions will be implemented that include expansion of hydroelectric supply, supply from renewable energy sources – particularly wind farms, small hydro and bio-electricity, and biofuels sources – and higher energy efficiency targets.

Cemig's strategic plans are designed to expand low-carbon source installed capacity. The company invests in construction of new hydroelectric plants, both SHPs (small hydroelectric plants – from 1 MW to 30 MW) and standard hydroelectric plants – over 30 MW, and in wind farms. Furthermore, it has worked hard to acquire know-how on solar photovoltaic



electricity generation with the intention of making this source a significant part its own generation matrix. In 2013 and 2014, Cemig boosted its ownership interest in Renova with its sights set on a growth model designed to intensify use of different renewable sources. The key purpose of entering the controlling shareholder block of Renova is to make that company its main driver of growth in the field of renewable energy (excluding hydroelectric expansion). Renova has focused on generation of renewable electricity through wind, small hydro and solar power plants and currently owns the largest wind farm in Latin America (more than 1 GW of installed capacity), along with an extensive portfolio of projects with a capacity factor above the national average. In 2014, in the 2014 LER auction, Renova sold 42.7 MW average, corresponding to 150.4 MW of installed wind and solar power capacity: 21.8 MW average of solar power were sold, which corresponds to 106.9 MWp of installed capacity, to be generated by four solar complexes, and 20.9 MW average and 43.5 MW of installed wind power capacity was sold, to be generated by three wind farms. Both the solar complexes and the wind power farms are located in the Bahia state. Also, in 2014, the company sold 49.4 MW average on the regulated market at the A-5 New Energy Auction (LEN A-5 2014), to be generated by five wind farms representing 108.0 MW installed capacity.

In addition to the investments in electricity generation from renewable sources, Cemig has made significant investments to boost production process efficiencies to minimize distribution system electricity losses. This is its greatest source of GHG emissions. To reduce technical losses – that is, those inherent in electricity transmission through all equipment and transmission and distribution lines - Cemig invested more than R\$ 280 million in 2014 to bolster the electrical system and install fixed capacitors and distribution transformers equipped with amorphous core technology (which reduces load losses by about 80%). Thus, Cemig has been getting ready to participate in a possible emissions trading market to be established in Brazil.

Other preparation strategies for participation in emissions trading schemes are listed in the document “Cemig - 10 Initiatives for the Climate”, through which Cemig reaffirms its commitment to climate change. The most important initiatives in this regard include: generation of electricity from renewable sources; implementation of conservation and energy efficiency projects; projects for the natural gas sector; investments in new energy sources (as long as they are low-carbon); enhancement of process efficiencies; and transportation emission reductions.

**CC13.2 Has the company originated any project-based carbon credits or purchased any within the reporting period?**

No<sup>3</sup>.

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<sup>3</sup> Cemig has a portfolio of 12 low-carbon electricity generation projects connected to the Brazilian electrical grid, registered under the Clean Development Mechanism (CDM), encompassing Cemig's plants and plants in which Cemig has an ownership interest. This portfolio has the potential for annual generation of 5,087,309 carbon credits, which represents an annual reduction of emissions of 5,087,309 tCO<sub>2</sub>e. However, in 2014, these plants did not request issuance of carbon credits by the UNFCCC, so Cemig did not generate any carbon credits in the reporting year despite these plants' operations having led to emission reductions.

## CC14. Scope 3 Emissions

CC14.1 Please account for your organization's Scope 3 emissions, disclosing and explaining any exclusions.

Sources of Scope 3 emissions	Evaluation status	Metric tonnes CO <sub>2</sub> e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain suppliers	Explanation
Purchased goods and services	Not evaluated	-	-	-	-
Capital goods	Not evaluated	-	-	-	-
Fuel-and-energy-related activities (not included in Scope 1 or 2)	Not evaluated	-	-	-	Upstream emissions from fuel and electricity purchased by Cemig were not evaluated; also were not evaluated electricity losses in the transmission and distribution of electricity consumed by Cemig. In addition, emissions from the generation of electricity purchased for resale by Cemig were not evaluated. However, it is important to note that emissions due to losses in the transmission and distribution of electricity produced by Cemig's systems were accounted for in Scope 2. In addition, emissions from use of fossil fuels to transport oil from the refineries to Cemig's thermal plant were recorded accounted for; such transportation is by tanker trucks, and was considered in "upstream transportation and distribution."
Transportation and distribution (upstream)	Relevant, calculated	816.99	i) Data type and sources used, emission factors and GWP values (global warming potential of gas): total distance travelled data used for outsourced trucks that transport freight and for trucks that transported fuel to the	100%	-

			<p>Igarapé Thermal Plant. The emission factors for fuel consumed (diesel) and GWP values were obtained through the Brazil GHG Protocol calculation tool.</p> <p>ii) Description of the quality of reported emissions data: data were obtained directly from Cemig's suppliers of all vehicles that transported cargo for Cemig in 2014.</p> <p>iii) Description of the methodologies, assumptions and allocation methods used to calculate emissions: the calculations were made using the Brazil GHG Protocol tool (version 2014.0).</p>		
Waste generated in operations	Not relevant, explanation provided	-	-	-	<p>The Reverse Logistics and final disposal of waste are carried out by a department certified by the Environmental Management System – SGA – at Level 1, which receives the waste properly identified, sorted and packed from the areas that generated it. From January to December 2014 about 52,600 tonnes of industrial waste was disposed of in an environmentally appropriate manner, of which 52,500 tonnes were sold, recycled or regenerated (99.7%) and 171 tonnes (0.3%) were co-processed or incinerated.</p> <p>The waste sold consists mainly of cables and wires, scrapped transformers, scrap metal, scrapped meters, poles, cross arms, wood chips, i.e., inert materials.</p>
Business travel	Relevant, calculated	1,361.30	<p>i) Data type and sources, emission factors and GWP values (global warming potential of gas): data for total distance covered by Cemig employees in air travel on business. The emission factors and GWP values were obtained using the Brazil GHG Protocol tool.</p> <p>ii) Description of the quality of reported emissions data: the distances of all business air travel undertaken by all Cemig's employees in 2014 were calculated.</p> <p>iii) Description of the methodologies, assumptions and allocation methods</p>	100%	-

			used to calculate emissions: the calculations were made using the Brazil GHG Protocol tool (version 2014.0); furthermore, data from the site <a href="http://www.gcmmap.com">www.gcmmap.com</a> were used to calculate the distances between airports.		
Employee commuting	Relevant, calculated	586.36	<p>i) Data type and sources used, emission factors and values of GWP (global warming potential of gas): data for total distance travelled by employees by bus were used. The emission factors and the GWP values were obtained through the Brazil GHG Protocol tool.</p> <p>ii) Description of the quality of reported emissions data: the bus distances travelled by all the Cemig employee buses in 2014, as well as the type of vehicle used for these trips (home-work), were calculated.</p> <p>iii) Description of the methodologies, assumptions and allocation methods used to calculate emissions: the calculations were made using the Brazil GHG Protocol tool (version 2014.0).</p>	100%	-
Leased assets (the company as lessee)	Not relevant, explanation provided	-	-	-	Cemig has no leased assets.
Transportation and distribution (downstream)	Relevant, calculated	5,728.50	<p>i) Data types and sources used, emission factors and GWP values (global warming potential of gas): total fuel consumption data of vehicles of contractors who provide services for Cemig's distribution of electricity were used. The emission factors and the GWP values were obtained through the Brazil GHG Protocol tool.</p> <p>ii) Description of the quality of reported emissions data: data were provided by contractors whose vehicles provide operation and maintenance services for the electricity distribution network. 6 of the 45 contractors provided data for calculation of GHG emissions from this source.</p> <p>iii) Description of the methodologies, assumptions and allocation methods used to calculate emissions: the calculations were made through the Brazil GHG Protocol tool (version 2014.0).</p>	100%	<p>In 2012, Cemig began to quantify emissions from vehicles of contractors who provide operation and maintenance services for the Distribution area.</p> <p>In 2014, of the 45 companies that provide this type of service, 6 responded with information, which is equivalent to 13% of the total. It should be noted that the contractors participate and contribute information voluntarily.</p>
Processing of sold products	Not relevant, explanation provided	-	-	-	The product Cemig sells (electricity) is not processed as is the case of an intermediate product for production of consumer goods; rather,

					electricity is a production process input, not an intermediate good. Thus, this emission source does not apply to Cemig.
Use of sold goods and services	Relevant, calculated	11,324,277	<p>i) Data types and sources, emission factors and GWP (global warming potential of the gas) values used: data on consumption by end consumers of electricity generated by Cemig was used. The emission factor of the Brazilian electrical system and GWP values were obtained through the Brazil GHG Protocol tool.</p> <p>ii) Description of the quality of reported emissions data: the company precisely monitors data on electricity consumption by customers.</p> <p>iii) Description of the methodologies, assumptions and allocation methods used to calculate emissions: the calculations were made by the Brazil GHG Protocol tool (version 2014.0).</p>	100%	The main source of Cemig's Scope 3 emissions is the consumption of electricity sold by the company and used by industrial, commercial or residential end consumers. Since the electricity sold by Cemig is transmitted on the National Grid System, the emission factor of this system was used to calculate these emissions.
End of life treatment of sold products	Not relevant, explanation provided	-	-	-	The product sold by Cemig (electricity) does not require end of life treatment since it does not generate waste to be treated or to be disposed. Thus, this source is not applicable to Cemig.
Downstream leased assets (the organization as lessor)	Not evaluated	-	-	-	-
Franchises	Not relevant, explanation provided	-	-	-	Cemig does not have franchises. Thus, this source of emissions is not applicable to the Company.
Investments	Not evaluated	-	-	-	-

**CC14.2 Please indicate the verification/assurance status that applies to the company's reported Scope 3 emissions.**

Third party verification or assurance complete

*If Scope 3 emissions have been subject to third party verification or assurance (complete or underway):*

**CC14.2a Please provide further details of the verification/assurance undertaken, and attach the relevant statements.**

Type of verification or assurance	Attach the statement	Page / section reference	Relevant verification standard	Proportion of reported Scope 3 emissions verified (%)
Reasonable assurance	<i>GHGEmissionsCemig2014_Verification_TemplateCDP</i>	The entire document	ISO14064-3	100%

**CC14.3 Has the company been able to compare its Scope 3 emissions for the reporting year with those for the previous year for any sources?**

Yes.

If "Yes":

**CC14.3a Please identify the reasons for any change in your Scope 3 emissions and for each of them specify how your emissions compare to the previous year.**

Sources of Scope 3 emissions	Reason for change	Emissions value (percentage)	Direction of change	Comments
Transportation and distribution (upstream)	Emissions reduction activities	2.07%	Emissions decrease	<p>The distance travelled by outsourced trucks hauling cargo decreased from 2,301,688 km in 2013 to 910,016 km in 2014. This reduction was due to logistics optimization initiatives.</p> <p>The distance travelled by fuel tanker trucks to the Igarapé Thermal Plant increased from 64,710 km in 2013 to 285,795 km in 2014. This increase was due to the plant's higher production in 2014.</p> <p>If all other conditions for emission sources were unchanged between the two years, this net reduction in distance would have led to a reduction of Scope 3 transportation and distribution (upstream) emissions of 2.07%, considering the two aspects mentioned above (decreased distance in cargo hauling and increased distance for fuel transportation trips).</p>
Employee commuting	Emissions reduction activities	5.32%	Emissions decrease	<p>Cemig analysed the bus routes of employees in Belo Horizonte (urban diesel buses), which wound up reducing the distance travelled by employees commuting by this means of transportation, with 40,324 fewer kilometres travelled in 2014 compared to 2013. This represented a 16.52% decline in GHG emissions for this transportation category.</p> <p>This category was responsible for 32% of emissions from the "Employee commuting" source of Scope 3 emissions in 2013, leading to a total reduction of GHG "Employee commuting" emissions of 5.32%.</p>
Employee commuting	Unidentified	22.98%	Emissions decrease	<p>There was a decrease in the distance Cemig's employees travelled on Minas Gerais state roads on diesel-fuelled buses, down 292,933 kilometres in 2014 compared to 2013. This represented a 48.50%</p>

				<p>reduction in GHG emissions from this transportation category. This category was responsible for 60% of the "Employee commuting" source of Scope 3 emissions in 2013, leading to a total reduction of GHG emissions from the "Employee commuting" emissions of 29.31% in total.</p> <p>On the other hand, there was an increase of 287,102 km travelled by employees commuting in gasoline-fuelled light vehicles in 2014, compared to 2013, representing a GHG emissions increase of 85.48% in this transportation category. The category accounted for 7% of emissions from the Scope 3 "Employee commuting" source in 2013. Therefore, this increase in distance travelled led to an increase of total GHG emissions by the "Employee commuting" source of 6.33%.</p> <p>Together, the two situations, whose causes were not analysed by Cemig, led to an overall decrease of total GHG emissions by the "Employee commuting" source of 22.98%.</p>
Transportation and distribution (downstream)	Changes in output	50.46%	Emissions decrease	<p>The data provided by the contractors responsible for downstream transportation pointed to a 28% reduction in gasoline consumption, 42% in ethanol and 52% in diesel. Changes in Cemig's orders for these suppliers were the reason the companies' consumption figures were lower.</p> <p>Overall, the reductions in fuel consumption led to 50.46% lower transmission and distribution (downstream) Scope 3 emissions</p>
Business travel	Change in methodology	19.51%	Emission decrease	<p>Business-related airline trip distances in 2014 increased 4.1% over 2013, but the GHG emission factors were lower for short, medium and long distances. This led to a 19.51% reduction of emissions for the category.</p>
Use of sold goods and services	Change in methodology	41.15%	Emission increase	<p>The increase in the National Grid emission factor from 0.0960 tCO<sub>2</sub>e/MWh in 2013 to 0.1355 tCO<sub>2</sub>e/MWh in 2014 meant that the same amount of electricity for consumption generated by Cemig in each of these two periods would represent 41.15% more emissions on the part of consumers of this electricity in 2014, compared to 2013. Electricity consumption emissions by Cemig's clients accounted for 99.93% of the company's Scope 3 emissions in 2014.</p>

**CC14.4 Does the company engage with any of the elements of its value chain on GHG emissions and climate change strategies?**

- Yes, our suppliers
- Yes, our customers
- Yes, other partners in the value chain
- No, the company is not engaged



If “Yes, our suppliers”, “Yes, our customers” or “Yes, other partners in the value chain” is ticked:

**CC14.4.a Please give details of methods of engagement, strategy for prioritizing engagements and measures of success.**

Concerning engagement with suppliers, through the third edition of the Program for Carbon Management in the Value Chain of CTClima (Thematic Chamber of Energy and Climate Change) of the CEBDS (Brazilian Business Council for Sustainable Development), Brazil’s representative of the World Business Council for Sustainable Development (WBCSD) since 2012, Cemig has been including the GHG emission inventories of its suppliers in the Company’s information base. The purpose of the program is to work with suppliers, especially those with the highest impact on Cemig’s emissions, to prepare and publish GHG inventories, raising awareness and training the selected suppliers. Since its inception, the Program for Carbon Management in the Value Chain already has increased awareness about and trained 256 suppliers of its affiliates in how to prepare their own GHG emissions inventories. Cemig was one of the Program’s sponsors in the 2014 edition, along with 10 other CEBDS member companies. In the third edition, 123 suppliers were trained through the Program, up 22% from the prior year; 33 suppliers completed emission inventories and another four are being prepared, an increase of about 10% compared to 2013.

Engagement methods: The selected suppliers were invited to participate in workshops. The main objective is to raise awareness among participants about the need to adapt how they manage their businesses to cope with climate change. Additionally, aimed at technical training to enable preparation of GHG inventories, the workshops were used to introduce the Brazilian GHG Protocol Program’s calculation tool and how to use it. The definition of operating limits, identification and classification of the main emission sources and categorization of emissions between the three scopes were the priority subjects. The workshops were run from April to June 2014 in six different locations.

Strategy for prioritizing engagements: 50 companies were invited to participate in the program, and priority was given to small and medium sized suppliers who need help in preparing the GHG inventory.

Measures of success: Considering all suppliers to all the companies participating in the third edition of the Program, 35% (123 companies) participated in 2014’s workshops, a 22% increase compared to the second edition in 2013 (noting that Cemig participated only as of the second edition). In terms of evaluation: 49% graded the workshops “very good” and 44% as “excellent.” In terms of inventories, 80% said they intended to prepare GHG inventories. Of the 72 companies confirming interest, 46% subsequently completed them.

Of these 123 suppliers, 33 finished their emission inventories and another four are in the preparation stage, an increase of approximately 10% compared to the 2013 edition of the Program. Cemig is continuing to run the project and will organize additional workshops to duly engage with the 50 selected suppliers. The measurement Cemig uses to gauge the success of this program is supplier participation in the workshops and actual preparation of GHG inventories after the companies conclude their training.

Cemig has introduced the Intelligent Energy (Energia Inteligente) Program for client engagement purposes. This project fosters energy efficiency in low-income communities and non-profit and philanthropic institutions that consume Cemig's electricity. Furthermore, it promotes energy efficiency in public facilities. The Intelligent Energy Program consists of three sub-programs: "Energy for Good", "Living Together", and "Eco-efficient City Halls" (Energia do Bem, Conviver and Prefeituras Ecoeficientes). The "Energy for Good" program targets charities and non-profit organizations. "Living Together" program is aimed at low-income consumers. And the "Eco-efficient City Halls" program is for better municipal energy management practices. All these initiatives reduce electricity consumption by the people and entities served by the company.

Engagement methods: Cemig sets up collaborative projects with consumers selected for the program. Under the program it replaces equipment by more efficient models, refurbishes electrical systems, and teaches efficient energy use practices and an understanding of the resulting reduction of environmental impact.

Strategy for prioritizing engagements: Low-income communities and non-profit and philanthropic institutions are given priority for participating in Cemig's Intelligent Energy Program.

Measures of success: In 2014, the "Energy for Good" program was responsible for replacing electric showers in 41 institutions for the elderly and in 14 public hospitals and charities – and replacement of 30 autoclaves and 6,638 sets of electric lighting fixtures and lamps in hospitals. The "Living Together" program installed 2,176 solar heating systems and replaced 232,445 light bulbs, 4,282 refrigerators and 110 irrigation systems with over 15 years of use at family farms through the *Jaíba* Project.

*And if "Yes, our suppliers" is ticked, complete questions CC14.4b and CC14.4c*

**CC14.4b To give a sense of scale of this engagement, please give the number of suppliers with whom you are engaging and the proportion of your total spend that they represent.**

Number of suppliers	% of total spend	Comment
50	8.76%	Cemig invited 50 suppliers to participate in the third edition of the Program for Carbon Management in the Value Chain, giving priority to small and medium-sized suppliers who need help in preparing their GHG inventories.

**CC14.4c If the Company has data on its suppliers' GHG emissions and climate change strategies, please explain how you make use of that data.**

How the Company makes use of the data	Please give details
Other	<p>Cemig uses the data from these inventories to assess the scope of the Program for Carbon Management in the Value Chain. In 2014, data from some suppliers was included in Cemig's GHG emissions inventory.</p> <p>Suppliers were invited to participate in Cemig's Program for Carbon Management in the Value Chain in 2014. Cemig is running training courses for these suppliers to boost awareness about climate change and the need to prepare GHG inventories, qualifying them to conduct this quantification process.</p>

## Supplement Electric Energy Utilities

The following information refers to emissions from stationary sources for electricity generation and not to Scope 1 as a whole.

### EU0 Reference dates

EU0.1 Please enter the dates for the periods for which you will be providing data. The years given as column headings in subsequent tables correspond to the “year ending” dates selected below. It is requested that you report emissions for: (i) the current reporting year; (ii) one other year of historical data (i.e. before the current reporting year); and, (iii) one year of forecasted data (beyond 2019 if possible).

Year ending	Start date	End date
2008	1/1/2008	12/31/2008
2014	1/1/2014	12/31/2014
2019	1/1/2019	12/31/2019

### EU1 Global totals by year

EU1.1 In each column, please give a total figure for all the countries for which you will be providing data for the “year ending” periods that you selected in answer to EU0.1.

Year ending	Nameplate capacity (MW)	Production (GWh)	Absolute emissions (metric tonnes CO <sub>2</sub> e)	Emissions intensity (metric tonnes CO <sub>2</sub> e/MWh)
2008	6,572	33,413	239,275	0.0072
2014	7,182	26,323	599,399	0.0228
2019	9,261	49,249	167,078	0.0034

### EU2 Individual Country profiles

EU 2.1 Please select the energy sources/fuels that you use to generate electricity in this country (Brazil).

- Coal - hard
- Lignite
- Oil & gas (excluding CCGT)
- CCGT

- ( ) Nuclear
- ( ) Waste
- (x) Hydro
- (x) Other renewables
- (x) Other

Please complete the following table for the “year ending” periods that you selected in answer to EU0.1 for oil & gas (excluding CCGT).

Year ending	Nameplate capacity (MW)	Production (GWh)	Absolute emissions (metric tonnes CO <sub>2</sub> e)	Emissions intensity (metric tonnes CO <sub>2</sub> e/MWh)
2008	131	205	239,275	1.1672
2014	131	743	577,458	0.7772
2019	131	202	157,340	0.7789

Please complete the following table for the “year ending” periods that you selected in answer to EU0.1 for hydropower.

Year ending	Nameplate capacity (MW)	Production (GWh)
2008	6,387	32,777
2014	6,950	25,110
2019	9,342	45,823

Please complete the following table for the “year ending” periods that you selected in answer to EU0.1 for other renewable sources (wind).

Year ending	Nameplate capacity (MW)	Production (GWh)
2008	1	0
2014	49	143
2019	735	2,824

Please complete the following table for the “year ending” periods that you selected in answer to EU0.1 for other sources (blast furnace gases, tar and other residual gases generated in steelmaking industrial processes).

Year ending	Nameplate	Production	Absolute	Emissions
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	capacity (MW)	(GWh)	emissions (metric tonnes CO <sub>2</sub> e)	intensity (metric tonnes CO <sub>2</sub> e/MWh)
2008	53	430	0	0.0000
2014	53	327	21,316	0.0651
2019	53	400	9,738	0.0243

Please enter total figures for this country for the “year ending” periods that you selected in answer to EU0.1.

Year ending	Installed capacity (MW)	Production (GWh)	Absolute emissions (metric tonnes CO <sub>2</sub> e)	Emissions intensity (metric tonnes CO <sub>2</sub> e/MWh)
2008	6,572	33,413	239,275	0.0072
2014	7,182	26,323	599,399	0.0228
2019	9,261	49,249	167,078	0.0034

### EU3 Renewable electricity sourcing regulations

EU3.1 In certain countries, e.g. Italy, the UK, and the USA, electricity suppliers are required by regulation to incorporate a certain amount of renewable electricity in their energy mix. Is your organization subject to such regulatory requirements?

No.

### EU4 Renewable Electricity Development

EU4.1 Please give the contribution of renewable electricity to your organization’s EBITDA (Earnings Before Interest, Tax, Depreciation and Amortization) in the current reporting year in either monetary terms or as a percentage.

Please give:	Monetary figure	%	Comment
Renewable electricity's contribution to EBITDA	R\$ 3,611 million	-	-

EU4.2 Please give the projected contribution of renewable electricity to your organization’s EBITDA at a given point in the future in either monetary terms or as a percentage.

Please give:	Monetary figure	%	Year ending	Comments
Renewable electricity's	-	40%	2020	We expect to maintain the percentage proportion of renewable power in the

contribution to EBITDA				organization's generation mix.
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**EU4.3 Please give the capital expenditure (capex) planned for the development of renewable electricity capacity in monetary terms and as a percentage of total Capex planned for power generation in the current capex plan.**

Please give:	Monetary figure	%	End year of capex plan	Comment
Capex planned for renewable electricity development	R\$ 1,270,767,000	76.00%	2017	In the current Capex plan, substantial investments are allocated in the generation business, in which 98% of the electricity generated is from renewable sources.

## CDP Sign off

**CC15.1 Please provide the following information for the person that has signed off (approved) the CDP climate change response.**

Name	Job title	Corresponding job category
Mateus de Moura Lima Gomes	Deputy CEO	Chief Officer (member of the Executive Board)