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# Carbon Disclosure Project

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## 2012

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Companhia Energética  
de Minas Gerais



English Version

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## Introduction

### Q0.1 Introduction

Founded in 1952 by then Governor of the State of Minas Gerais, Mr. Juscelino Kubitschek de Oliveira, Companhia Energética de Minas Gerais – Cemig is active in the generation, transmission and distribution of electric energy, in addition to providing energy solutions (Efficientia S.A.). Operations are coordinated by a holding company (Companhia Energética de Minas Gerais – Cemig) and its two subsidiaries: Cemig Geração e Transmissão S.A. (Cemig GT) and Cemig Distribuição S.A. (Cemig D). It has stakes in 114 companies, 15 consortia and one participation fund, with assets and businesses in 22 Brazilian states and in the Federal District, in addition to Chile. The Company also has investments in natural gas distribution (Gasmig S.A.) and in data transmission (Cemig Telecom).

Cemig is a joint-stock company controlled by the Government of Minas Gerais with 115,000 shareholders in 44 different countries (data from January/2012) and shares listed on the BM&FBovespa S.A., in New York – the New York Stock Exchange (NYSE) and in Madrid – Mercado de Valores Latino-Americanos (Latibex). Cemig's net operational revenues reached R\$ 15.8 billion in 2011, based on a matrix whose primary sources of energy are renewable resources.

The Company has 10,600 kilometers of transmission lines and a total installed capacity of 6,964 MW. In the electric energy distribution field, Cemig is responsible for approximately 12% of the Brazilian domestic market (both captive and free) and boasts 468,000 kilometers of distribution lines, servicing nearly 7 million people in 774 municipalities in the State of Minas Gerais. In 2011, the Company increased to 32.5% its equity stake in Light, an energy distributor that supplies the capital of the State of Rio de Janeiro and other municipalities in the same State. It also has equity stakes in transmission companies that comprise TBE – Transmissoras Brasileiras de Energia, which owns and operates transmission lines in the North and South of the Country, and holds a 56.69% equity stake in Transmissora Aliança de Energia Elétrica S.A. (Taesa). At the end of 2011, Cemig had 8,706 direct employees.

Not including the energy generated by Light S.A. (Light), Cemig's generation system has an installed capacity of 6,687 MW, in which 96.5% is from hydroelectric generation, 2.8% from thermal generation (2% from steel mill process waste gases and 0.8% from fuel oil) and 0.7% from wind power. Adding in the generation capacity of Light, Cemig's installed capacity reaches 6,964 MW.

For its commitment to socio-environmental principles, its economic-financial solidity and technical excellence, the Company is internationally renowned as a benchmark in sustainability in its industry

and is positioned as one of the main consolidation vectors in the Brazilian electric energy sector. Cemig has been listed in the Dow Jones Sustainability Index (DJSI World) for 12 years, ever since the index was created, and is participating, for the 7<sup>th</sup> consecutive time, in the Corporate Sustainability Index (ISE) of BM&F Bovespa and was selected to be part of the Carbon Efficient Index (ICO2), created in 2010 by BM&F Bovespa and BNDES.

#### MISSION

“To perform in the energy industry sector with profitability, quality and social responsibility”.

#### VISION

“To be, in 2020, one of the two largest energy groups in Brazil in terms of market value, with a relevant presence in the Americas, and a world leader in sustainability in its sector”.

### **Q0.2 Reporting Year**

01/01/2011 a 31/12/2011.

### **Q0.3 Country list configuration**

Brazil.

### **Q0.4 Currency selection**

BR\$(\$) – Reais.

### **Q0.6 Modules**

Electric Utilities.

## Management

### 1. Governance

#### Q1.1 Where is the highest level of direct responsibility for climate change within your company?

Individual/Sub-set of the Board or other committee appointed by the Board.

#### If there is a person or committee responsible:

##### Q1.1a Please identify the position of the individual or name of the committee with this responsibility.

The corporate area responsible for climate change in the organization is the **Corporate Sustainability Superintendence (SE)**, which is linked to the Office of Vice-President (DVP) and answers directly to the Presidency. Among the attributions of the Office of the Vice-President is the responsibility for improvements to Company's social responsibility and sustainability policies and directives, as well as the definition of policies and directives related to the environment, to technological development, to alternative energy sources and to technical norms.

The DVP was responsible for the development of Cemig's declaration of commitments related to Climate Change<sup>1</sup>. Also, it was the responsibility of the DVP to produce the Service Instruction (IS) that establishes the obligation to assess carbon risks for all new enterprises that utilize fossil fuels, the conduction of the greenhouse gas (GHG) emissions inventory and the proposal of the emissions reduction goal.

Finally, those strategic directives that have guided Cemig in the past years follow suit with the broader global goals aimed at mitigating climate change. The investments and actions presented below are examples of Cemig's strategic alignment with such objectives:

- Smart Grid
- *Conviver Solar* Project
- Renewable Energy Sources
- Acquisition of stake in Renova (Renova seeks to generate energy through renewable sources (such as wind power and Small Hydroelectric Plants – SHPs),

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<http://www.cemig.com.br/sites/en/Sustainability/ClimateChanges/Documents/DezIniciativasClimaING.pdf>

acting today as Cemig's renewable energy expansion branch). A generation system that is predominantly renewable and good socio-environmental practices can attract a greater number of investors, demonstrating Cemig's commitment and preparation to deal with the subject of climate change and its efforts to generate value by taking advantage of opportunities available to energy companies within the context of a low carbon economy.

Other themes related to climate change are responsibility of specific Executive Offices and Committees, as shown below.

**Theme:** Climate Change Risks

**Area Responsible:** **Corporate Risk Monitoring Committee (CMRC)**, which has the attribution to propose, for approval by the Executive Board, directives, policies and procedures to be adopted in the Corporate Risk Management Process, among those the risks related to climate change.

**Theme:** Carbon Credits

**Areas Responsible:**

- **Executive Commercial Office (DCM)** has the attribution to manage the commercialization of the Company's carbon credits in conjunction with the Executive Business Development Office;
- **Executive Business Development Office (DDN)** has the attribution to promote the search for and analysis of, within the scope of the Company, business opportunities related to taking advantage of carbon credits.
- **Corporate Sustainability Superintendence (SE)**, which is linked to the DVP, has the attribution to develop strategies for prospecting for new opportunities in business environments, including emission reduction certificates.

**Theme:** Energy Efficiency

**Area Responsible:** **Executive Distribution and Commercialization Office (DDC)** has the attribution to conduct programs and projects related to energy efficiency at third party facilities.

**Theme:** Innovation

**Area Responsible:** **Technology and Alternative Energy Superintendence (TE)**, which is linked to the DVP, has the attribution, among others, to prospect for technology and to conduct strategic analyses, to develop scenarios and to identify needs, strategic interests,

opportunities and threats, as well as to propose feasibility studies on alternative energy sources as new business and market service opportunities, and to participate in the implementation of research and technological development projects and in the establishment of experimental or pilot facilities, in the area of energy alternatives;

**Q1.2 Do you provide incentives for the management of climate change issues, including the attainment of targets?**

Cemig provides financial incentives for the achievement of sustainability goals, with issues related to climate change directly related to these goals.

## 2. Strategy

### **Q2.1 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.

#### **Q2.1a Please provide further details.**

Risk management at Cemig currently contemplates 144 risks. These are classified into process risks, or corporate risks, and strategic risks, which directly affect the company's business. Corporate risks are managed through processes that may therefore be present in more than one area of the company. Cemig believes that the main environmental risks to its activities are changes in legislation and issues related to global climate change, which may result in physical, regulatory and strategic risks.

In 2011 the **Corporate Risk Monitoring Committee (CMRC)** was created. It has the following main attributions: (I) Propose, for approval by the Executive Board, directives, policies and procedures to be adopted in the Corporate Risk Management Process, thus guaranteeing continual improvement to processes, and promoting their dissemination; (II) Analyze and propose to the Executive Board priority actions covering risks categorized as "critical" in the final exposure matrix; and (III) Submit for approval by the Executive Board mechanisms to render operational the strategic monitoring of identified corporate risks and effective actions to reduce levels of financial exposure and intangible impact to an acceptable level, keeping in mind mitigating action plans, aligned with the Company's Long Term Strategic Plan.

Risk management at the company utilizes the ORCA (Objectives, Risks, Control and Alignment) methodology. The management process involves identifying risks related to Cemig's strategic objective (O), measuring the materialization of these risks (R), including the intangible impacts, establishing controls to mitigate the risks (C), and, finally, quantifying the impact of the risk (A) through the Integrated Risk Management System (SGIR), which assesses the company's exposure to each risk identified and the probability of their occurrence.

The risk matrix is revised annually. The company's 177 macroprocesses are revised and the established prioritization allows for the creation of a risk hierarchy within the matrix. Climate risks are related, mainly, to Cemig's exposure to physical risks (Weather Related) related to climate change. Due to our dependence on hydroelectric generation and the

potential impacts on the distribution and generation infrastructure resulting from extreme weather events, the company identifies and manages climate risks related to electric energy generation and distribution processes.

Once the prioritization is listed and performed, the company can (i) accept the risk when the controls are sufficient or if the mitigation plan is costlier than the predicted impact, (ii) transfer the risk to an insurer or (iii) reduce exposure to the risk when it is understood that the controls are not sufficient to completely mitigate the risk. In the latter case, action plans are created in order to allow for the establishment of sufficient controls.

For strategic risks, management is more qualitative and is conducted through a Risk Management Committee composed by 15 superintendents that meet every 2 months.

With regard to opportunities, Cemig is actively engaged in the assessment and development of its projects portfolio aimed at reducing Greenhouse Gas emissions through renewable generation using hydroelectric sources and, more recently, wind and solar power. The company understands that its greatest opportunities are related to the generation of renewable energy.

Other opportunities are related to the commercialization of carbon credits, expansion of the supply of natural gas, investments in Small Hydroelectric Plants (SHPs), energy cogeneration in the steel sector and studies aimed at the future utilization of alternative sources such as solar power, biomass and biomass waste, wind power and other sources being studied.

**Q2.2 Is climate change integrated into your business strategy?**

Yes.

**If there is integration between climate change and business strategy:**

**Q2.2a Please describe the process and outcomes.**

- i. The influence of climate change on Cemig's strategy was communicated in 2011 by means of two publicly available documents. The first consists of the public communication<sup>2</sup> called "10 climate initiatives", whose objective was to communicate

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<sup>2</sup> Public Circular "10 Climate Initiatives". Available at <http://www.cemig.com.br/sites/en/Sustainability/ClimateChanges/Documents/DezIniciativasClimaING.pdf>.

Cemig's strategy for mitigating, adapting to and announcing climate changes to society, demonstrating Cemig's preparation for and commitment to a low carbon economy. It is aimed at aligning the businesses based on an assessment of climate change risks and opportunities, informing society and investors of the company's lines of action.

The second document is the Annual and Sustainability Report, which mentions Cemig's actions with regard to climate change. It is part of the company's business strategy to be a world leader in the energy sector in terms of sustainability. In the low carbon economy scenario, Cemig identifies consistent business opportunities and chances to obtain advantageous market positions, primarily resulting from its energy matrix and from its preparation and adaptation to possible climate change.

- ii. In accordance with the documents mentioned above, the need imposed by climate change to develop low carbon energy matrices is a factor that has been guiding Cemig's action for many years. Cemig identifies consistent business opportunities and chances to obtain advantageous market positions, primarily resulting from its energy matrix, which are materialized in the installation and renovation of renewable source energy plants in which Cemig already has ample expertise and in the investment in new energy sources, which allows it to incorporate innovation and technology programs into its activities.

It is also necessary to seek energy efficiency, due to climate change, opening up business opportunities for Cemig, which today is involved in the development and implementation of technological solutions that promote the efficient use of energy and the consequent reduction in GHG emissions at the facilities of medium and large clients in the commercial, industrial and service sectors.

On the other hand, Cemig assesses the increased risk of GHG emissions in its energy matrix and the financial impact of this increase by conducting environmental due diligence and sensibility analyses related to the acquisition of new enterprises (carbon risk assessment), which supports decisions regarding the expansion of its business.

Lastly, the final objective of any action that is associated with climate change – the reduction of GHG emissions – causes Cemig position itself out in front of the issue, through the establishment of reduction targets, which must be achieved through improvements in efficiency in its thermal plant and through the expansion of renewable energy, among other measures.

- iii. There are many components to Cemig's strategy that are influenced by climate change in the short term (up to 5 years). In order to achieve operational efficiency in asset management, one of the company's strategic points, Cemig invests in operational practices that leave it with greater security in the face of possible

climate change, with the aims of prevention and adaptation. The company utilizes the latest techniques and equipment, which allows for high quality in the forecasts of the intensity and location of weather events, with the goal of mitigating interruptions in the electricity supply due to meteorological causes. This also results in higher quality hydrological forecasts, resulting in safety in hydroelectric operations and for the surrounding population.

In addition, in order to achieve the strategic vision of being among the largest energy groups in Brazil and being a world leader in sustainability, the need imposed by climate change to develop low carbon energy matrices guides the company's actions in the installation and renovation of renewable source electricity plants in the short term.

Also with the objective of maintaining and improving its position with regard to sustainability, in early 2012 Cemig established its corporate target for reducing emissions: reduce GHG emissions intensity (tCO<sub>2</sub>e/MWh) by 8% by 2015, in comparison with the emissions recorded in 2008.

- iv. In the same manner, there are many components of Cemig's strategy that are influenced by climate change in the long term (more than 10 years). In order to achieve the strategic vision Cemig needs to develop low carbon energy matrices guides the company's actions related to the incorporation of new technologies. This has guided technology R&D projects that may be implemented on a large scale in the future, such as the development of the solarimetric atlas, the generation of electricity at solar plants connected to the electric system and the implementation of a smart grid.
- v. In addition, recent acquisitions by Cemig demonstrate its position with regard to its intention to strengthen its focus on the expansion of renewable energy: increase in its stake in Light and the acquisition of the stake in Renova Energia;, and today serves as Cemig's renewable energy expansion branch.
- vi. The climate change scenario opens up opportunities for new business, as mentioned above. For this reason, Cemig has a company, Efficientia S.A., that develops and implements technological solutions that promote the efficient use of energy and the consequent reduction in GHG emissions at the facilities of large and medium clients in the commercial, industrial and service sectors.
- vii. The maintenance of predominantly renewable matrix and the carbon risk assessment allow Cemig to be proactive with regard to the risks associated with an increase in the cost of generating electricity.

In addition, the development of new technologies, mainly energy generation from solar sources, places Cemig at the vanguard in the electric sector, allowing for the

incorporation of new technologies into its matrix and the diversification of its business.

viii. Below are the strategic decisions made in 2011 that were influenced by climate change:

- acquisition of a stake in the Belo Monte HPP (9.77%), in Light (increased its stake to 32.5%) and in Renova Energia (through Light, Cemig acquired 25.8% of the capital in Renova, resulting in an indirect stake of 8.4%);
- repowering program for hydroelectric plants with the goal of reestablishing their lifetime: São Simão, Volta Grande and Salto Grande HPPs;
- development of the first edition of the Solarimetric Atlas of Minas Gerais;
- signing of agreements for the installation of the Sete Lagoas Solar Plant and Mineirão Solar in 2012;
- investments in new enterprises: Santo Antônio HPP, Paracambi SHP, Pipoca SHP.

**Q2.3 Do you engage with policy makers to encourage further action on mitigation and/or adaptation?**

Yes.

**If there is engagement with policy makers related to climate change:**

**Q2.3a Please explain (i) the engagement process and (ii) actions you are advocating.**

I. Engagement process

- i. Engagement method: financing of third party initiatives, in the private sector.

Cemig participates in the Minas Gerais Forum on Global Climate Change, which participates in the development of public policies at the state level related to climate change. Among other objectives, the Forum proposes norms for the institution of a State Climate Change Policy, in line with the National Climate Change Policy and other correlated public policies. In addition, the company also participates in the Thematic Energy and Climate Change Chamber (CTClima) and in the Brazilian Corporate Council for Sustainable Development (CEBDS). CTClima represents the vision of CEBDS member companies with regard to issues related to climate change, in debates and in the formulation of public policies with governments and other stakeholders. Cemig has a chair in the Forum and in CTClima, sponsoring Position Papers and White Papers related to the subject.

- ii. Engagement topic: through the sponsorship of Position Papers and White Papers at the Forum and CTClima, Cemig assists with surveys of state and federal policies related to climate change. In 2011, Cemig was one of the financiers of the White Papers for Rio +20, including the White Paper Rio +20 Energy. The White Papers subsidize the development of a proposal to the Brazilian Government for the Declaration that will be adopted at the Rio +20 Conference, which will define new directives for global sustainable development.
  - iii. Engagement nature: participation in the development of policy related to climate change.
- II. Actions defended

- i. The White Paper Rio +20 Energy proposes policies that allow for the maintenance of the renewable Brazilian energy matrix and also allow it to be sustainable.

In order to stimulate the expansion of wind power, the document proposes that the Brazilian Government adopt a long term policy, linking the large scale installation of wind power with Nationwide Adequate Mitigation Actions (NAMA), within the context of the United Nations Framework Convention on Climate Change (UNFCCC). This would have the effect of encouraging the international community to assist the Country through additional financial concessions, sharing licensing costs, joint technological development and technical cooperation for adaptation of wind turbines to local conditions, among others.

In addition, the document proposes that the Brazilian Government adopt an incentive policy for the installation of new alternative source electricity projects, through the purchase of such energy at energy auctions at higher prices. It also proposes a reduction in customs duties to favor the importation of wind turbine components and other parts, thus facilitating maintenance and providing an incentive for the domestic manufacture of this equipment.

Additionally, the White Paper Rio +20 proposes that financial institutions develop special lines of credit for renewable energy ventures and for energy efficiency measures, mainly for small and medium sized ventures. It also proposes the creation of multilateral funds so that developing countries can receive international resources for technological development related to clean energy generation, especially considering that the implementation of these projects produces a greater return in areas where technologies have not yet been consolidated.

Finally, the document recommends incentive policies for the implementation of smart grids, lighting energy efficiency (with an emphasis on LED technology)

and new urban mobility strategies (in order to reduce the demand for fossil fuels in the transportation sector).

### 3. Targets and Initiatives

**Q3.1 Did you have an emissions reduction target that was active (ongoing or reached completion) in the reporting year?**

Yes (intensity targets).

If there are targets:

**Q3.1b Please provide details on your intensity target.**

ID	Scope	% of emissions in scope	% reduction from base year	Metric	Base Year	Normalized base year emissions (tCO <sub>2</sub> e / MWh)	Target year	Comments
I-01	1	100	8	tCO <sub>2</sub> e / MWh	2008	0.007801	2015	-

**Q3.1c Please also indicate what change in absolute emissions this intensity target reflects.**

ID	Direction of change in absolute Scope 1 or 2 emissions at target completion?	% change anticipated in absolute Scope 1 or 2 emissions	Direction of change in absolute Scope 3 emissions at target completion?	% change anticipated in absolute Scope 3 emissions	Comments
I-01	Increase	13.71	-	-	<p>Despite the reduction in GHG emissions per MWh produced by Cemig when the target will be reached, the company is planning to expand its production on the order of 24% by 2015 in relation to 2008, leading to an increase in absolute scope 1 emissions.</p> <p>No new thermal plants are scheduled to enter into operation by 2015. The increase in absolute emissions may occur due to increased operation of the Igarapé Thermolectric Plant.</p>

**Q3.1d Please provide details on your progress against this target made in the reporting year.**

ID	% complete (time)	% complete (emissions)	Comments
I-01	43	100	The corporate target was established in 2012. Scope 1 emissions have been reduced sharply in comparison with 2008 emissions, which already represent an approximate reduction of 90% in the emissions

			intensity (scope 1 emissions in tCO <sub>2</sub> e / MWh). Cemig's GHG emissions depend on the operation of its single thermoelectric plant; the fact that it has not operated in the last two years has resulted in this significant reduction in emissions.
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**Q3.2 Does the use of your goods and/or services directly enable GHG emissions to be avoided by a third party?**

Yes.

**If the utilization of the organization's assets and/or services directly allows GHG emissions to be avoided by a third party:**

**3.2a Please provide details.**

Efficientia S.A.: is a whole subsidiary of Cemig. It develops technological solutions that promote the efficient use of energy, thus reducing GHG emissions at the facilities of medium and large clients in the commercial, industrial and service sectors. Efficientia conducts energy diagnostics and identifies opportunities to reduce consumption.

- i. Between 2004 and 2011, 34 projects were concluded. The actions undertaken varied from the replacement of inefficient lighting systems to the construction of cogeneration plants utilizing process gases. In 2011, Efficientia signed contracts for the modernization of compressed air systems, the installation of frequency inverters to control the velocity of motors and for the modernization of lighting systems using LED systems.
- ii. At the end of 2011, the accumulated emissions reductions from all the projects implemented by Efficientia that are fully operational reached an average of 3,213 tCO<sub>2</sub>/year.
- iii. The electricity saved in the above-mentioned period corresponded to 110,037 MWh/year. To calculate the emissions reduction, we utilized the annual emissions factor for the Brazilian Electric System (SIN) for 2011, calculated by the Ministry of Science, Technology and Innovation - MCTI<sup>3</sup>, multiplied by the quantity of electricity saved.
- iv. The generation of CERs (Certified Emission Reductions) within the scope of the CDM was not considered in any of the projects implemented.

<sup>3</sup> GHG emission factors for the National Interconnected System for the greenhouse gas emissions inventory. Available at <http://www.mct.gov.br/index.php/content/view/321144.html#ancora>.

Intelligent Energy: The program has the directive to develop projects that promote a culture of efficiency in the use of electric energy.

- i. The Intelligent Energy Program encompasses three projects: *Conviver*, *Conviver Solar* and *Conviver Rural – Jaíba*.

The objective of the *Conviver Solar* project is the installation of solar water heating systems in housing projects, with the goal of reducing electricity consumption. At the end of 2001, 15,000 solar heaters had been installed at residences.

The objective of the *Conviver* Project is to reduce consumption and demand for electricity for low income families. In 2011, 6,000 shower heads, 1,150,000 lamps and 24,000 refrigerators with a high consumption rate were replaced with more efficient equipment.

The *Conviver Rural - Jaíba* Project is aimed at updating family agricultural irrigation systems located in the Jaíba Project that have been in use for more than 15 years. With drip and micro spray irrigation, Cemig provides energy and water savings. In 2011, 424 systems were replaced.

- ii. In 2011 the program prevented the emission of 1,290 tCO<sub>2</sub>e.
- iii. In 2011 the program allowed for a reduction in energy consumption of 44,178 MWh. To calculate the emissions reduction, we utilized the annual emissions factor for the SIN for 2011, calculated by the MCTI3, multiplied by the quantity of electricity saved during the year.
- iv. The generation of CERs (Certified Emission Reductions) within the scope of the CDM was not considered in any of the projects implemented.

Gasmig: is a Cemig subsidiary and the exclusive distributor of piped natural gas throughout Minas Gerais, serving the industrial, general use, residential, compressed natural gas, liquefied natural gas, automotive and thermoelectric segments.

- i. In 2011 Gasmig concluded the construction of 8.6 km of natural gas distribution networks, with the total network extension now being 800.3 km spread throughout 41 municipalities and serving 30 of them. The company brings natural gas infrastructure to strategic regions in the Minas Gerais State, allowing more carbon intensive fossil fuels to be replaced in manufacturing plants.
- ii. In 2011, the consumption of natural gas distributed by Gasmig avoided the emission of approximately 644,644 tCO<sub>2</sub>e.
- iii. Gasmig monitors the quantity of natural gas supplied to the three sectors it serves: industrial, vehicular and thermoelectric. The estimate for emissions reduction was performed based on the assumption that in the absence of natural gas distribution, industry would consume residual oil, vehicles would consume gasoline and

thermoelectric plants would utilize diesel fuel. Utilizing the emissions factors, the lower heat of combustion and densities of the Brazil GHG Protocol, emissions with natural gas (real scenario) and emissions in the case of utilization of waste oil, gasoline and diesel (baseline scenario) were calculated; the real scenario emissions were subtracted from the baseline scenario emissions, with the remainder being defined as avoided emissions.

- iv. The generation of CERs (Certified Emission Reductions) within the scope of the CDM was not considered by Gasmig.

**Q3.3 Did you have emissions reduction initiatives that were active within the reporting year (this can include those in the planning and implementation phases)?**

Yes.

**Q3.3a 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 tCO <sub>2</sub> e savings
To be implemented	11	2,510
Implementation initiated	2	61,938
Implemented	1	144,510

**Q3.3b For those initiatives implemented in the reporting year, please provide details in the table below.**

Activity type	Description of activity	Estimated annual tCO <sub>2</sub> e savings	Annual monetary savings (unit currency)	Investment required (unit currency)	Payback period
Energy Efficiency: processes	<p>This comprises actions that are aimed at reducing electric energy losses in the distribution system.</p> <p>These losses are inherent to the transport of energy along the transmission and distribution equipment and lines. They are influenced, among other factors, by</p>	126,572	Confidential information	Confidential information	Confidential information

	<p>dispatch conditions at the plants, the level at which electric system reinforcement work is carried out, the behavior of the consumer market and by carrying out specific reduction actions. For further details, see the Annual and Sustainability Report, "Loss Management" item.</p>				
Low carbon energy installation	<p>The Pipoca SHP entered into operation in 2011. It has an installed capacity of 20 MW and a physical guarantee of 11.9 MW, which represents estimated generation of 104,244 MWh / year. This is a voluntary activity. The associated GHG emission reductions are scope 1.</p>	3,044	Confidential information	Confidential information	Confidential information
Transportation: fleet	<p>Cemig has a policy that sets the maximum useful life of the vehicles in its fleet at 5 years. In 2011 Cemig replaced 2,047 vehicles in its fleet: 854 flexible-fuel passenger vehicles, 869 pickup trucks, 324 trucks, along with the acquisition of 6 TetraFuel vehicles. This is a voluntary activity. The associated GHG emission reductions are scope 1.</p>	14,894	Confidential information	Confidential information	Confidential information

Low carbon energy installation	<p>The Paracambi SHP is in the installation phase. It has an installed capacity of 25 MW and physical guarantee of 20.34 MW, which represents estimated generation of 178,178 MWh / year. This is a voluntary activity. The associated GHG emission reductions are scope 1.</p>	5,203	Confidential information	Confidential information	Confidential information
Low carbon energy installation	<p>The Santo Antônio HPP is in the installation phase. It has an installed capacity of 3,150 MW and physical guarantee of 2,218 MW, which represents estimated generation of 19,429,680 MWh / year. This is a voluntary activity. The associated GHG emission reductions are scope 1. Only 10% of the emission reductions associated with the Santo Antônio HPP were considered within the scope of the CDP, as Cemig has a 10% equity stake in the HPP.</p>	56,735	Confidential information	Confidential information	Confidential information

**Q3.3c What methods do you use to drive investment in emissions reduction activities?**

Method	Comment
Compliance with regulatory requirements/standards	Federal Law No. 9,991/2000: 1% of the organization's net operational revenues must be invested in financing R&D in energy efficiency programs.
Dedicated budget for energy efficiency	Energy efficiency actions undertaken at the facilities of large

	consumers are remunerated through success rates in achieving energy savings.
Financial optimization calculations	Cemig incorporates GHG emission parameters during the assessment prior to the technical-economic feasibility studies for new projects, considering the potential financial gains from the commercialization of carbon credits. This assessment has helped Cemig in decision making regarding the execution of projects that show to be eligible for the Clean Development Mechanism (CDM). It is important to note that in 2010 a specialist in carbon credits joined the company's valuation area.
Internal finance mechanisms	The replacement of the vehicle fleet is performed using resources from the Company Investment Program. Cemig has the directive to renew its vehicle fleet annually so that the average age of the vehicles does not exceed 5 (five) years, which is the legal depreciation period established by the granting power. The depreciation rate is 20% per year.

## 4. Communications

**Q4.1 Have you published information about your company'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	Page / section of reference	Attachment identification
In the Annual and Sustainability Report (available on the Company website) – for the previous year	Sustainability	<a href="http://portalcemig/sites/en/TheCemig/Documents/Relatorio_ing.pdf">http://portalcemig/sites/en/TheCemig/Documents/Relatorio_ing.pdf</a>
In voluntary communications (complete)	Investor relations website: News and Highlights from 2011	<a href="http://cemig.infoinvest.com.br/">http://cemig.infoinvest.com.br/</a>
In other regulatory filings (complete)	Form 20F: The Carbon market, p. 52	<a href="http://cemig.infoinvest.com.br/enu/1375/43_1_151_ingl%EAs_relatorios_sec_cemig%2020-f fs.pdf">http://cemig.infoinvest.com.br/enu/1375/43_1_151_ingl%EAs_relatorios_sec_cemig%2020-f fs.pdf</a>
In voluntary communications (complete)	GHG emissions inventory	<a href="http://portalcemig/sites/en/Sustainability/ClimateChanges/Documents/Invent%C3%A1rioGHG.Cemig_vers%C3%A3o.fina.l.ING.pdf">http://portalcemig/sites/en/Sustainability/ClimateChanges/Documents/Invent%C3%A1rioGHG.Cemig_vers%C3%A3o.fina.l.ING.pdf</a>
In voluntary communications (complete)	Cemig's commitment to Climate Change	<a href="http://www.cemig.com.br/sites/en/Sustainability/ClimateChanges/Documents/DezIniciativasClimaING.pdf">http://www.cemig.com.br/sites/en/Sustainability/ClimateChanges/Documents/DezIniciativasClimaING.pdf</a>

## Risks & Opportunities

### 5. Climate Change Risks

**Q5.1 Have you identified any climate change risks (current or future) that have the potential to generate a substantive change in your business operations, revenue or expenditure? Tick all that apply.**

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

**Q5.1a Please describe your risks driven by changes in regulation.**

ID	Risk driver	Description	Potential Impact	Time frame	Direct / Indirect	Likelihood	Magnitude of impact
R-1	New regulations related to carbon emissions	<p>Within the climate change policy scenario established by the Kyoto Protocol, Brazil does not yet have quantified-obligations to reduce or limit GHG emissions.</p> <p>However, in 2009 at the Conference of the Parties (COP 15) in Copenhagen, Brazil announced a voluntary reduction target of between 36.1% and 38.9% in projected GHG emissions for 2020, which was quickly officialized nationally through the promulgation of Law 12,187/2009 which instituted the National Climate Change Policy. This measure may serve as an incentive for more carbon intensive sectors to reduce their GHG emissions.</p>	Increased operational costs	1-5 years	Direct	Medium	Very Low

**Q5.1b Please describe (i) the potential financial implications of the risk before taking action; (ii) the methods you are using to manage this risk and (iii) the costs associated with these actions.**

The risk listed is comprised by Cemig's risk matrix and is managed by the Risk Management System (SGIR). (i) A relevance analysis is conducted and is considered confidential by the company. (ii) Risk monitoring is performed by monitoring legal

discussions, within both the federal and state scopes. (iii) The costs associated are those that are related to the maintenance of the environmental and risk management teams.

**Q5.1c Please describe your risks that are driven by change in physical climate parameters.**

ID	Risk driver	Description	Potential Impact	Time frame	Direct / Indirect	Likelihood	Magnitude of impact
Ph-1	Changes in precipitation extremes and droughts	Climate change may bring undesirable consequences for reservoirs in terms of their continuous silting, which may be quickened or slowed, depending on the changes in the pluviometric and hydrological regimes. This may reduce the useful lives of reservoirs and increase maintenance costs.	Reduction / disruption in production capacity	>10 years	Direct	Low	Medium
Ph -2	Other physical climate drivers	Other physical climate risk drivers: imprecision in meteorological forecasts, impacting the energy distribution business and operation of reservoirs.  Meteorological forecasts are prepared for three time horizons: short, medium and long term. The short term forecasts are utilized for distribution, media purposes and the operation of reservoirs. The other two (medium and long term) are used for the operation of the reservoirs, energy planning and commercialization, Therefore, if there are any imprecision in the meteorological forecasts, these activities will be impacted.	Other, please specify: impact on the company's forecasts and scenarios	> 10 years	Direct	Medium	Medium
Ph -3	Changes in precipitation extremes and droughts	Cemig constantly monitors and assesses the condition of its dams, since there may be a risk of problems due to excessive rain. This work is part of the Dam Assessment and Classification Methodology and subsidizes planning and maintenance with the objective of reducing the probability of a failure, thus minimizing the physical risks to assets and	Reduction / disruption in production capacity	> 10 years	Direct	Very Low	High

		employees.					
Ph -4	Changes in precipitation extremes and droughts	An energy matrix highly concentrated in hydroelectric sources is sensitive to possible changes in rainy and dry seasons. The main difficulty with the use of this resource lies in the variability of upstream flows to the dams, which can result in variations in energy production. Cemig has pioneering prevention and mitigation processes for these risks, which gives the Company a competitive advantage in terms of the approach to and preparation for climate change risks.	Reduction / disruption in production capacity	> 10 years	Direct	Low	High

**Q5.1d Please describe (i) the potential financial implications of the risk before taking action; (ii) the methods you are using to manage this risk and (iii) the costs associated with these actions.**

The risks listed are comprised by Cemig's risk matrix and are managed by the Risk Management System (SGIR). (i) A materiality analysis is conducted and is considered confidential by the company. (ii) Risk monitoring is performed by monitoring meteorological stations and statistical climate forecasting models, in addition to monitoring of the quality and level of reservoirs. (iii) The costs associated are those that are related to the maintenance of the meteorological, dam safety and risk management teams.

**Q5.1i Please explain why you do not consider your company to be exposed to risks driven by physical climate parameters that have the potential to generate a substantive change in your business operations, revenue or expenditure.**

The identification of risks is performed through the assessment of 177 of the company's processes. So far, no other risk caused by climate change has been identified by the risk management team or by the upper administration.

## 6. Climate Change Opportunities

**Q6.1 Have you identified any climate change opportunities (current or future) that have the potential to generate a substantive change in your business operations, revenue or expenditure? Tick all that apply.**

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

**Q6.1a Please describe your opportunities that are driven by changes in regulation.**

ID	Opportunity driver	Description	Potential Impact	Time frame	Direct / Indirect	Likelihood	Magnitude of impact
R-1	Emission reporting obligations	Cemig's current generation matrix is predominantly renewable. The existence of the obligation to report emissions will provide evidence that its energy matrix is low emission, which may attract investors to the Company, in addition to improving its reputation.	Increased stock price (market valuation)	6-10 years	Direct	Likely or unlikely	Low
R-2	Product efficiency regulations and standards	The establishment of energy efficiency standards implies the adoption of measures to reduce peaks in demand, thus allowing for greater regularity in the energy supply curve, which optimizes the utilization of the entire system.	Premium price opportunities	Current	Indirect (Client)	Very Likely	Medium
R-3	Product labelling regulations and standards	In the event there is a trend that favors the acquisition of a renewable energy source (Green energy), Cemig will benefit due to its having a renewable matrix that is already recognized as a strategic advantage.	Premium price opportunities	6-10 years	Direct	Likely	Low
R-4	Other regulatory drivers	In a scenario of carbon emission regulation in Brazil, Cemig would be little affected given its history and maintenance of low total emissions.	Reduced capital costs	>10 years	Direct	Very Likely	Low
R-5	Other regulatory drivers	Other regulatory drivers: Lines of Financing for Renewable Energy. Reduced spreads for lines of credit aimed at	Reduced capital costs	1-5 years	Direct	Very Likely	Medium

		renewable energy generation may constitute an opportunity to reduce the company's capital costs					
R-6	Cap and trade schemes	A cap-and-trade market in Brazil may offer an opportunity for Cemig due to its renewable matrix. The company may be an important supplier of certified emission reductions to the market.	Increased stock price (market valuation)	6-10 years	Direct	Likely	Medium

**Q6.1b Please describe (i) the potential financial implications of the opportunity; (ii) the methods you are using to manage this opportunity and (iii) the costs associated with these actions.**

(i) A relevance analysis of the opportunities is conducted and is considered confidential. (ii) Opportunity monitoring is performed by monitoring legal discussions, within both the federal and state scopes. (iii) The costs associated are those that are related to the maintenance of the risk management, environmental, meteorological, carbon credit commercialization and alternative energy teams.

**Q6.1c Please describe the opportunities that are driven by changes in physical climate parameters.**

ID	Opportunity driver	Description	Potential Impact	Time frame	Direct / Indirect	Likelihood	Magnitude of impact
Ph-1	Change in precipitation extremes and droughts	Identifying the physical changes resulting from changes in precipitation patterns as an opportunity and based on the 4 <sup>th</sup> Report from the IPCC, it has been observed that in the Southeastern and Southern regions of Brazil, where Cemig has the majority of its reservoirs, the availability of water may further fluctuate between maintenance and increased water production, as the high Southern latitudes are approached. In virtue of this, and in accordance with this study, hydroelectric energy production may increase with climate alterations.	Increased production capacity	> 10 years	Direct	Likely or Unlikely	High
Ph-2	Other physical climate opportunities	Other physical climate opportunities: Changes in wind patterns. Increased temperatures may	Increased production capacity	> 10 years	Direct	Likely or Unlikely	High

		imply alterations in wind patterns, creating opportunities for wind farms.				
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**Q6.1d Please describe (i) the potential financial implications of the opportunity; (ii) the methods you are using to manage this opportunity and (iii) the costs associated with these actions.**

(i) A materiality analysis of the opportunities is conducted and is considered confidential. (ii) Opportunity monitoring is performed by monitoring meteorological stations and statistical climate forecasting models. (iii) The costs associated are those that are related to the maintenance of the risk management and meteorological teams.

**6.1e Please describe the opportunities that are driven by changes in other climate-related developments.**

ID	Opportunity driver	Description	Potential Impact	Time frame	Direct / Indirect	Likelihood	Magnitude of impact
O-1	Reputation	In a low carbon market, Cemig has a good reputation among stakeholders due to its renewable matrix and research and development activities related to alternative energies and efficiency programs. The company has been part of the Dow Jones Sustainability Index for 12 years, since its creation and is part of the Efficient Carbon Index created by BMF&Bovespa and BNDÉS.	Increased share price	1-5 years	Direct	Very Likely	Medium
O-2	Changing consumer behavior	The likely rise in average temperatures will cause a change in consumption patterns such as, for example, an increase in the use of ventilation and refrigeration systems, which will result in increased demand for energy.	Increased demand for existing products and services	6-10 years	Direct	Very Likely	High
		The greatest demand for energy will be directly reflected in discussions on the search for low carbon energy alternatives and the consequent increase in the commercialization of renewable energy.					
O-3	Changing consumer behavior	Possibility of commercializing its low carbon intensity energy at a differentiated and competitive prices in an established low carbon energy market.	Opportunity to establish differentiated product prices	6-10 years	Direct t	Likely or Unlikely	Medium
O-4	Others drivers	Cemig's robust meteorological forecasting service may be an opportunity for new business for the Company.	New products and services rendered to companies	1-5 years	Direct	Likely or Unlikely	Medium
O-5	Others drivers	If there are increases in corporate investments in energy efficiency there will be opportunities for new business	New products and services	1-5 years	Direct	Very Likely	Medium

		for the company through its subsidiary Efficientia.	rendered to companies				
O-6	Others drivers	In a low carbon market, with its recognized expertise in innovation and prevention, Cemig can seek synergies with other partners in the development of new products and services.	New products and services rendered to companies	6-10 years	Direct	Very Likely	Medium

**Q6.1f Please describe (i) the potential financial implications of the opportunity; (ii) the methods you are using to manage this opportunity and (iii) the costs associated with these actions.**

(i) A materiality analysis of the opportunities is conducted and is considered confidential. (ii) Opportunity monitoring is performed based on the variation in the company's market value, market research and the assessment of new business opportunities. (iii) The costs associated are those that are related to the maintenance of the investor relations, new business and risk management teams.

## 7 Emissions Methodology

### Reference year:

2008.

- The base year was recalculated due to the updating of the Brazil GHG Protocol Programme tool in 2011, currently in version v2011.2

### Q7.1 Please provide your base year and base year emissions (Scopes 1 and 2).

Base year	Scope 1 Base year emissions (metric tonnes of CO <sub>2</sub> e)	Scope 2 Base year emissions (metric tonnes of CO <sub>2</sub> e)
2008	260,641	282,439

### Q7.2 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.

- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
- Brazil GHG Protocol Programme
- Other

If "other" has been marked:

#### Q7.2a If you have selected "Other", please provide details below.

- ABNT NBR ISO 14064-1. Specification and orientation for the quantification and development of greenhouse gas emission and removal reports.
- Intergovernmental Panel on Climate Change (IPCC) 2006, IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by National Greenhouse Gas Inventories Programme.

### Q7.3 Please give the source for the global warming potentials you have used.

Gas	Reference
CO <sub>2</sub> (1)	IPCC Second Assessment Report (SAR - 100 years)
CH <sub>4</sub> (21)	
N <sub>2</sub> O (310)	
SF <sub>6</sub> (23,900)	

### Q7.4 Please give the emissions factors you have applied and their origin; alternatively, please attach an Excel spreadsheet with this data.

Fuel/Material/Energy	Emission Factor	Unit	Reference
Residual Fuel Oil	3.11	kgCO <sub>2</sub> e/L	Brazilian Program GHG Protocol
Natural Gas	2.07	kgCO <sub>2</sub> e/m <sup>3</sup>	Brazilian Program GHG Protocol
Other: Gasoline C	2.269	kg CO <sub>2</sub> /L	Brazilian Program GHG Protocol
Diesel Oil	2.671	kg CO <sub>2</sub> /L	Brazilian Program GHG Protocol
Aviation Fuel	2.232	kg CO <sub>2</sub> /L	Brazilian Program GHG Protocol
Liquefied Petroleum Gas (LNG)	2.9324	kg CO <sub>2</sub> /L	Brazilian Program GHG Protocol
Electricity	0.0292	kgCO <sub>2</sub> /kWh	Ministry of Science and Technology (MCT), Brazil
Other: Air travel	0.1106 (long) 0.0983 (medium) 0.1753 (short)	Other kgCO <sub>2</sub> /passenger.km	DEFRA

## 8 Emissions Data

**Q8.1 Please select the boundary you are using for your Scope 1 and 2 greenhouse gas inventory.**

- Operational control

**Q8.2a Please provide your gross global Scope 1 emissions figures in metric tonnes CO<sub>2</sub>e.**

24,479 tCO<sub>2</sub>e.

**Q8.3a Please provide your gross global Scope 2 emissions figures in metric tonnes CO<sub>2</sub>e.**

168,189 tCO<sub>2</sub>e.

**Q8.4 Are there any sources (e.g. facilities, specific GHGs, activities, geographies etc.) of Scope 1 and Scope 2 emissions which are not included in your disclosure?**

Yes.

**If the answer is positive:**

**Q8.4a Please complete the table.**

Source	Scope	Explain why this source is excluded
Emissions related to the disposition and treatment of solid waste and liquid effluents were not quantified.	3	Data unavailability

**Q8.5 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 1 Emissions: Uncertainty range	Scope 1 Emissions: Main sources of uncertainty	Scope 1 Emissions: Please expand on the uncertainty in your data	Scope 2 Emissions: Uncertainty range	Scope 2 Emissions: Main sources of uncertainty	Scope 2 Emissions: Please expand on the uncertainty in your data
+/- 5.1% (More than 5% but less than or equal to 10%)	Lack of data Data management	Between 23,230 and 25,727	+/- 5.1% (More than 5% but less than or equal to 10%)	Between 159,611 and 176,766	Variability in the emission factors

**Q8.6 Please indicate the verification/assurance status that applies to your Scope 1 emissions.**

- Verification complete

**In the event the verification / assurance is being performed or has been completed:**

**Q8.6a Please indicate the proportion of your Scope 1 emissions that are verified/assured.**

- 100%

**Q8.6b Please provide further details of the verification/assurance undertaken, and attach the relevant statements.**

Level of verification or assurance	Relevant verification standard
Reasonable assurance	ISO14064-3

**Q8.7 Please indicate the verification/assurance status that applies to your Scope 2 emissions.**

- Verification completed

**In the event the verification / certification is being performed or has been completed:**

**Q8.7a Please indicate the proportion of your Scope 2 emissions that are verified/assured.**

- 100%

**Q8.7b Provide additional details on the on-going verification / certification and attach relevant statements.**

Level of verification or assurance	Relevant verification standard
Reasonable assurance	ISO14064-3

**Q8.8 Are carbon dioxide emissions from the combustion of biologically sequestered carbon (i.e. carbon dioxide emissions from burning biomass/biofuels) relevant to your company?**

No. In 2011 emissions from the combustion of biomass totaled 1,182 tCO<sub>2</sub>e.

## 9 Scope 1 Emissions Breakdown

**Q9.1 Do you have Scope 1 emissions sources in more than one country or region (if covered by emissions regulation at a regional level)?**

No.

**Q9.2 Please indicate which other Scope 1 emissions breakdowns you are able to provide (tick all that apply).**

- By business division
- By GHG type
- By activity

**Q9.2a 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	3,126
Cemig D	15,572
Rosal Energia	1.8
Sá Carvalho	31
Efficientia	4
Cemig Telecomunicações	22
Ipatinga Thermoelectric Plant	146
Barreiro Thermoelectric Plant	5,577

**Q9.2c Please break down your total gross global Scope 1 emissions by GHG type.**

GHG type	Scope 1 emissions (metric tonnes CO <sub>2</sub> e)
CO <sub>2</sub>	18,668
CH <sub>4</sub>	377
N <sub>2</sub> O	1,982
SF <sub>6</sub>	3,452

**Q9.2d Please break down your total gross global Scope 1 emissions by activity.**

Activity	Scope 1 emissions (metric tonnes CO <sub>2</sub> e)
Stationary combustion	6,113
Mobile Combustion	14,894
Fugitive Emissions	3,452

## 10 Scope 2 Emissions Breakdown

**Q10.1 Do you have Scope 2 emissions sources in more than one country or region (if covered by emissions regulation at a regional level?)**

No.

**Q10.2 Please indicate which other Scope 2 emissions breakdowns you are able to provide (tick all that apply).**

- By business division
- By activity

**Q10.2a 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	13,314
Cemig D	154,875
Rosal Energia	0
Sá Carvalho	0
Efficientia	0.2
Cemig Telecomunicações	0.2
Ipatinga Thermoelectric Plant	0
Barreiro Thermoelectric Plant	0

**Q10.2c Please break down your total gross global Scope 2 emissions by activity.**

Activity	Scope 2 emissions (metric tonnes CO <sub>2</sub> e)
Purchased electric energy	1,369
Losses in the system	166,820

## **11 Scope 2 Contractual Emissions**

**Q11.1 Do you consider that the grid average factors used to report Scope 2 emissions in Question 8.3 reflect the contractual arrangements you have with electricity suppliers?**

Yes.

**Q11.2 Has your organization retired any certificates, e.g. Renewable Energy Certificates, associated with zero or low carbon electricity within the reporting year or has this been done on your behalf?**

No.

## 12 Energy

### 12.1 What percentage of your total operational spend in the reporting year was on energy?

Confidential Information.

### 12.2 Please state how much fuel, electricity, heat, steam and cooling in MWh your organization has consumed during the reporting year.

Energy type	MWh
Fuel	82,568
Electricity	46,888

### 12.3 Please complete the table by breaking down the total "Fuel" figure entered above by fuel type.

Fuel	MWh
Residual Fuel Oil	65,899
Other: Gasoline	12,637
Diesel	39,962
Natural Gas	14

## 13 Emissions Performance

### 13.1 How do your absolute emissions (Scope 1 and 2 combined) for the reporting year compare to the previous year?

Decreased.

#### 13.1 a Please complete the table.

Reason	Emissions values (percentage)	Direction of change	Comment
Emissions reduction activities	58	Decrease	Emission reduction activity: Scope 1. Reduction of 18,784 tCO <sub>2</sub> e due to the replacement of fossil fuels with residual gas at the Ipatinga Plant.
Change in methodology	57	Decrease	Reduction of the Scope 2 emission due to reduction of the emission factor of the National Interconnected System (SIN) from 0.0513 tCO <sub>2</sub> /MWh in 2010 to 0.0292 tCO <sub>2</sub> /MW in 2011.

### 13.2 Please describe your gross 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 in from previous year	Reason for change
0.00002	mtCO <sub>2</sub> e	Net revenue (R\$)	60	Reduction	Combined effect of the increase in net revenue and reduction in emissions.

**13.3 Please describe your gross 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	Reason for change
22.13	mtCO <sub>2</sub> e	Full time employee	59	Decrease	Despite the reduction in the number of employees in 2011, in relation to 2010, the 58% global reduction in emissions led to a decrease in the indicator.

**13.4 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	Reason for change
5.67	kgCO <sub>2</sub> e	MWh produced	85	Decrease	In 2010, this indicator considered only scope 1 emissions; in the current CDP (data from 2011), this indicator considers gross combined Scope 1 and 2 emissions. Considering scopes 1 and 2 emissions in in 2010, the indicator was 10.28 kg CO <sub>2</sub> e / MWh.

					Since in 2011 the value was 5.67 kg CO <sub>2</sub> e / MWh, the value decreased, due to the increase in the utilization of residual gases at the Ipatinga Plant
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## 14 Emissions Trading

### Q14.1 Do you participate in any emissions trading schemes?

No, but we anticipate doing so in the next 2 years.

#### Q14.1b What is your strategy for complying with the schemes in which you participate or anticipate participating?

The National Climate Change Policy (PNMC) features as one of its main policy tools the establishment of the Brazilian Emissions Reduction Market (MBRE). Even though the policy was approved in a generalist format, the PNMC clearly establishes that credits that are tradeable in the future MBRE shall have as one of their origins reductions in emissions accomplished in countrywide goals, therefore furnishing opportunities for pricing the carbon generated in actions aimed at reducing emissions. The PNMC does not establish sector goals, but establishes that in order to achieve the voluntary target established by Law No. 12.187/2009 of reducing projected emissions in Brazil, by 2020, between 36.1% and 38.9%, actions which include the expansion of the domestic hydroelectric supply and of the alternative renewable sources, notably wind farms, small hydroelectric plants and bioelectricity shall be undertaken, along with the expansion of the supply of biofuels, and increases in energy efficiency.

Therefore, the Brazilian market is not yet a reality, but is planned to be so in the very near future, in the form of the MBRE. Cemig is preparing for this scenario, through initiatives aimed at the reduction of emissions within the scope of the CDM (Clean Development Mechanism).

Cemig will be able to adapt to this new market through its predominantly renewable energy matrix, and through the development of a portfolio of projects aimed at reducing emissions, and also those developed within the scope of the CDM.

### Q14.2 Has your company originated any project-based carbon credits or purchased any within the reporting period?

Yes.

In the event of an affirmative answer:

#### Q14.2a Please complete the table.

Credit originating or credit purchase	Project type	Project Identification	Verified to which standard	Number of credits (metric tonnes CO <sub>2</sub> e)	Number of credits (metric tonnes CO <sub>2</sub> e): Risk adjusted volume	Credits retired	Purpose, e.g. compliance
Credit generation	Hydro	Project 3898: <i>Guanhães Energia CDM Project, Minas Gerais, Brazil (JUN1123)</i>	CDM (Clean Development Mechanism)	62,949 / year	51,618 / year	No	Compliance
Credit generation	Hydro	Project 3922: <i>Baguari Hydropower Plant CDM Project Activity</i>	CDM (Clean Development Mechanism)	65,532 / year	53,736 / year	No	Compliance
Credit generation	Hydro	Project 4788 : <i>Cachoeirão CDM Project (JUN1092)</i>	CDM (Clean Development Mechanism)	23,444 / year	19,244 / year	No	Compliance
Credit generation	Hydro	<i>Pipoca Small Hydropower Plant Project Activity</i>	CDM (Clean Development Mechanism)	24,082 / year	19,747 / year	No	Compliance
Credit generation	Hydro	<i>SHP Paracambi CDM Project (JUN 1064), Brazil</i>	CDM (Clean Development Mechanism)	60,819 / year	49,871 / year	No	Compliance
Credit generation	Other: thermal electric run on blast furnace gases	<i>Generation with Blast Furnace Gas of Siderpita (JUN 1060), Brazil</i>	CDM (Clean Development Mechanism)	3,529 / year	2,894 / year	No	Compliance
Credit generation	Wind	<i>Renova Area 1 Wind Power Project</i>	CDM (Clean Development Mechanism)	150,801 / year	120,641 / year	No	Compliance
Credit	Wind	<i>Renova Area 6-8</i>	CDM (Clean Development	117,424 / year	93,939 / year	No	Compliance

generation		<i>Wind Power Project</i>	Mechanism)				
Credit generation	Wind	<i>Renova 2010 Wind Parks.</i>	CDM (Clean Development Mechanism)	166,664 / year	133,331 / year	No	Compliance
Credit generation	Wind	<i>Renova LEN 11 Wind Power Project</i>	CDM (Clean Development Mechanism)	395,927 / year	316,742 / year	No	Compliance

## 15 Scope 3 Emissions

**Q15.1 Please provide data on sources of Scope 3 emissions that are relevant to your organization.**

Sources of Scope 3 emission	Metric tonnes CO <sub>2</sub> e	Methodology	In you cannot provide a figure for emissions, please describe them
Upstream transportation & distribution	1,591	Brazilian Program GHG Protocol	
Use of sold products	2,213,681	Brazilian Program GHG Protocol	
Business travel	1,889	Brazilian Program GHG Protocol	

**Q15.2 Please indicate the verification/assurance status that applies to your Scope 3 emissions.**

- Verification complete

**In the event the verification / assurance is being carried out or has already been concluded:**

**Q15.2a Please indicate the proportion of your Scope 3 emissions that are verified/assured.**

- 100%

**Q15.2b Please provide further details of the verification/assurance undertaken, and attach the relevant statements.**

Level of verification or assurance	Relevant verification standard	Relevant statements attached
Reasonable assurance	ISO14064-3	GHGEmissionsCemig_Verification

**Q15.3 Are you able to compare your Scope 3 emissions for the reporting year with those for the previous year for any sources?**

Yes.

**In the event of an affirmative answer:**

**Q15.3a Please complete the table.**

Sources of Scope 3 emissions	Reason for change	Emissions value (percentage)	Direction of change	Comment
Use of Products and Services sold	Alteration in Methodology	57	Decrease	Reduction in emissions factor in the National Interconnected System (SIN) from 0.0513 tCO <sub>2</sub> /MWh in 2010 to 0,0292 tCO <sub>2</sub> /MWh in 2011

**Person who signed off (approved) the CDP response**

Arlindo Porto Neto – Vice President

## Supplement for Electric Utilities

The information below refers to the emissions from stationary sources for the generation of energy and not to Scope 1 as a whole.

### EU0 Reference dates

EU 0.1 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 2016 if possible).

Year ending	Star date	End date
2008	01/01/2008	31/12/2008
2011	01/01/2011	31/12/2011
2015	01/01/2015	31/12/2015

### EU1 Total global per year

EU 1.1 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
2011	6,687	33,926	5,723*	0.0002
2015	7,972	41,297	167,078	0.0040

\* In 2011 the Igarapé Thermal Power Plant was not activated.

### EU2 Individual country profiles

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

- Oil & Gas (excluding CCGT)
- Hydro

- Other renewables
- Other

Fill in the table below for the periods selected in question EU 0.1 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	1.2
2011	131	0	0	0
2015	131	202	157,340	0.78

In 2011 the Igarapé Thermal Power Plant was not activated.

Fill in the table below for the periods selected in question EU 0.1 for hydroelectric plants.

Year ending	Nameplate Capacity (MW)	Production (GWh)
2008	6,387	32,777
2011	6,453	33,435
2015	7,869	40,572

Fill in the table below for the periods selected in question EU 0.1 for other renewable sources (wind power).

Year ending	Nameplate Capacity (MW)	Production (GWh)
2008	1	0
2011	50	123
2015	50	123

Fill in the table below for the periods selected in question EU 0.1 for other renewable sources (process gases).

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	53	430	0	0

2011	53	369	5,723	0.015
2015	53	400	9,738	0.024

Please enter total figures for this country 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
2011	6,687	33,926	5,723*	0.0002
2015	7,972	41,297	167,078	0.0040

\* In 2011 the Igarapé Thermal Power Plant was not activated.

### EU3 Renewable electricity sourcing regulations

**EU 3.1** In certain countries, e.g. Italy, the UK, the USA, electricity suppliers are required by regulation to incorporate a certain amount of renewable electricity in their energy mix. Is your company subject to such regulatory requirements?

No.

### EU4 Renewable electricity development

**EU 4.1** Please give the contribution of renewable electricity to your company'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	1,993 million		The generation business Ebitda represents 38% of Cemig's total.

**EU 4.2** Please give the projected contribution of renewable electricity to your company's EBITDA at a given point in the future in either monetary terms or as a percentage.

Please give:	Monetary figure	%	Projected year	Comments
Renewable electricity's contribution to EBITDA	Confidential information	27	2012	It is expected that the fraction of renewable sources in the organization's generation mix will remain the same

**EU 4.3 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 provide:	Monetary value	%	Final year of Capex planning	Comments
Capex planned for renewable electricity development	Confidential information	Confidential information	2012	Investments forecast for the Generation business, where 98% of the energy generated corresponds to renewable sources