
Carbon Disclosure Project

2013

Companhia Energética
de Minas Gerais



The best energy in Brazil

English Version

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Introduction Module

Q0.1 Introduction

Founded in 1952 by the then Governor of the Minas Gerais State, Mr. Juscelino Kubitschek de Oliveira, Companhia Energética de Minas Gerais (Cemig) operates in the generation, transmission, commercialization and distribution of electricity, 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 120 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 exploitation and distribution (Gasmig S.A.) and in data transmission (Cemig Telecom). Cemig holds a 26.06% stake in Light S.A., an energy distribution company that has operations in 31 municipalities in the State of Rio de Janeiro, covering a region with more than 11 million people. The company 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 Brazil, and holds a 43.36% equity stake in *Transmissora Aliança de Energia Elétrica S.A.* (Taesa).

Cemig is a publicly traded company controlled by the Government of Minas Gerais State (51%) with 121,000 shareholders in 40 different countries (data from December/2012). 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 Latinoamericanos* (Latibex). Cemig's net operational revenues reached R\$ 18.46 billion in 2012, based on a matrix whose primary sources of energy are renewable resources.

Not including the energy generated by Light, Cemig's generation system has an installed capacity of 6,747 MW, in which 96.6% is from hydroelectric generation, 2.7% from thermal generation (1.9% from fuel oil and 0.8% from steel mill process waste gases) and 0.7% from wind power. Cemig is thus one of the largest electricity generators in Brazil, with 63 hydroelectric power plants, 3 thermoelectric power plants and 4 wind farms. Adding in the generation capacity of Light, Cemig's installed capacity reaches 7,038 MW. The company has 9,748 kilometers of transmission lines and, in the electric energy distribution field, Cemig is responsible for servicing nearly 18 million people in 774 municipalities in the Minas Gerais State and for the management of the largest electricity distribution network in Latin America, which extends for over 480,000 km. At the end of 2012, Cemig had 8,368 direct employees.

For its commitment to socio-environmental responsibility principles, its economic and financial solidity and technical excellence, the company is internationally recognized as a benchmark in sustainability in its segment 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) for 13 years, ever since the index was created; it is participating, for the 8th consecutive time, in the Corporate Sustainability Index (ISE) of BM&F Bovespa; and it was selected for the 3rd time to be part of the Carbon Efficient Index (ICO2), created in 2010 by BM&FBovespa and BNDES. Also, in the 2012 CDP, Cemig was ranked as the company with the 3rd best performance in Brazil and the 2nd best in Latin America in the implementation of climate change mitigation measures.

MISSION

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

VISION

“To consolidate itself, in this decade, as the largest group in the national electric sector in terms of market value, with presence in gas, to be a world leader in sustainability, admired by clients and recognized for its solidity and performance”.

Q0.2 Reporting Year

01/01/2012 to 31/12/2012

Q0.3 Country list configuration

Brazil

Q0.4 Currency selection

BRL(R\$) - Reais.

Q0.6 Modules

Electricity Utilities module.

Management Module

1. Governance

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

Senior Manager/Officer.

If there is a responsible:

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

The highest-level person responsible for climate change issues at Cemig is the Vice-President Director, who answers directly to the company's Presidency. The Presidency is the highest level of the Executive Board, which answers directly to the Board of Directors.

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

Yes.

If there are incentives:

Q1.2a Please complete the table.

Who is entitled to benefit from these incentives?	The type of incentives	Incentivized performance indicator
Executive officer	Monetary reward	Indicator: Cemig's score in the Dow Jones Sustainability World Index. This index assesses issues related to climate change, along with other issues related to sustainability. Cemig's score in the Dow Jones Sustainability World Index is linked to the variable remuneration of the Vice-President Director (described in column 1 as an Executive Officer, though this position is at a higher hierarchical level than that of an executive officer, since this position does not fit into any other classification in the existing list).
Corporate executive team	Monetary reward	Indicator: Cemig's inclusion in the Efficient Carbon Index (ICO2) portfolio. Developed by BM&FBovespa and BNDES, the ICO2 is an indicator based on the IBrX-50 portfolio, which, when deciding upon which shares to include, considers the relation between companies' gross revenues and greenhouse gas (GHG) emissions, and thus assesses the GHG emissions efficiency. Cemig's inclusion in the ICO2 is linked to the variable remuneration of the team subordinated to the Vice-President Director.
Corporate executive team	Monetary reward	Indicator: Cemig's score in the environmental dimension of the Dow Jones Sustainability World Index. This index assesses issues related to climate change, along with other

		<p>issues related to sustainability.</p> <p>This team is also responsible for achieving Cemig's sustainability goals, with all matters related to climate change being directly linked to these goals.</p> <p>Cemig's score in the environmental dimension of the Dow Jones Sustainability World Index is linked to the variable remuneration of the team subordinated to the Vice-President Director.</p>
Energy managers	Monetary reward	<p>Indicator: index of energy losses in the electric system.</p> <p>Energy losses in the electric system are responsible for 99% of Cemig's Scope 2 emissions. In order to allow for the measurement of these losses reduction goal, the Total Distribution Losses Index (IPTD – <i>Índice de Perdas Totais da Distribuição</i>) was created with multi-year targets that are validated annually and monitored monthly. The target for 2012 was 12.07%, which is below the regulatory indices; the target defined for the end of 2015 is 10.6%, which is closer to the figures for North America (9.38%) than South America (17.23%).</p> <p>This loss index is linked to the variable remuneration of the Distribution Losses Management and Control Office team.</p>

2. Strategy

Q2.1 Please select the option that best describes your risk management procedures with regard to climate change risks and opportunities.

Integrated into multi-disciplinary company wide risk management processes.

Q2.1a Please provide further details.

Risk management at Cemig covers the Generation, Commercialization, Transmission, Distribution and Corporate business areas. The potential impacts of these risks are classified as being environmental, social, economic, socio-environmental, socio-economic, environmental-economic and sustainability related. The risks refer to events that may prevent the accomplishment of the objectives and directives established in the strategic planning process and are assessed as per their financial impact and likelihood of occurrence in the various businesses, thus assisting the senior management in decision-making in order to ensure the continuity of the business. The structure adopted for risk management is decentralized, i.e., all areas of Cemig must assess the risks related to the company's businesses, though the monitoring is centralized, which produces relevant information with a systemic view. The process is centralized in the Corporate Risk Management Committee (CMRC – *Comitê de Monitoramento de Riscos Corporativos*).

- i) Process scope: as abovementioned, the structure adopted for risk management is decentralized, which means that all risks related to climate change can be considered in the process. Cemig is especially attentive mainly to physical risks, due to the fact that its generation system is predominantly dependent on water resources and that extreme weather events can potentially impact the distribution and generation infrastructure. In addition, with the establishment of the National Policy for Climate Change (PNMC – *Política Nacional sobre Mudanças do Clima*) in Brazil, Cemig is also keenly aware of the risks related to the possible development of new regulations related to GHG emissions.
- ii) Risk assessment at the company level: for risks considered strategic (i.e., those that directly affect the company's business), a qualitative analysis methodology is employed by the members of the Corporate Risk Management Committee (CMRC). For operational risks, the ORCA (Objectives, Risks, Control and Alignment) methodology is used. This process involves identifying risks related to Cemig's strategic objectives (O), measuring the materialization of these risks, including the intangible impacts (R), establishing controls to mitigate the risks (C) and quantifying the impact of the risk (A)

through the Integrated Risk Management System (SGIR – *Sistema de Gerenciamento Integrado de Risco*), which assesses the company's exposure to each risk identified and the probability of their occurrence.

- iii) Risk assessment at the asset level: with respect to individual subsidiaries and plants, both strategic and operational risks are analyzed, with the same methodologies and structures described above to assess risks at the company level (see item ii above).
- iv) Frequency of risk monitoring: risks are assessed in a decentralized manner at Cemig, with all areas of the company reporting continuously to the CMRC. In addition, the CMRC meets every 2 months to qualitatively assess the strategic risks. Each year the CMRC prepares a final exposure matrix containing the risks assessed throughout the entire process.
- v) Criteria for the determination of materiality / priorities: Cemig uses scales to classify the risks according to their financial impact, probability of occurrence and importance to the company, with the distribution of percentage estimates between each of the points for each of the scales. Based on these scales, Cemig prioritizes each risk, which allows for definition of a hierarchy of risks within the matrix.
- vi) To whom the results of the risks assessment are reported: the CMRC presents the risk matrix to the Executive Board and proposes priority actions for the risks classified as critical. The Executive Board is directly subordinate to the Board of Directors. Thus, the CMRC proposes the priority actions and the Executive Board analyzes and approves (or not) the proposals.

With regard to the assessment of opportunities at Cemig:

- i) Process scope: all opportunities related to climate change are potentially considered in the process. Cemig is especially attentive to regulatory opportunities related to gaining economic advantages with the establishment of international climate change agreements, due to the fact that it has a clean electricity generation system and has, therefore, expertise in the implementation of projects that result in a reduction in GHG emissions, such as hydroelectric power plants, wind farms and solar energy plants. Additionally, due to the establishment of the National Policy for Climate Change (PNMC) in Brazil, Cemig is aware of the opportunities related to the possible development of new regulations related to GHG emissions.

- ii) Opportunity assessment at the company level: Cemig has a Competitive Intelligence Center that collects, analyzes, transfers and disseminates relevant knowledge and information in order to assist in decision-making. The Center monitors the evolution of the economic, institutional, competition and regulatory environments of its whole, controlled and affiliates subsidiaries, anticipates new trends in the energy sector by observing regulatory changes, mergers and acquisitions in the sector and the behavior of suppliers, competitors and partners.
- iii) Opportunity assessment at the asset level: the New Business Office promotes, coordinates, assesses and structures opportunities for the acquisition of new assets in all the company's sectors and activities, including business related to taking advantage of carbon credits. When structuring a new business (asset), technical, economic and financial and environmental feasibility analyses are performed in coordination with the related Executive Offices within the company.
- iv) Frequency of opportunity monitoring: the New Business Office and the Competitive Intelligence Center engage in their opportunity assessment and analysis activities in a continuous manner.
- v) Criteria for the determination of materiality / priorities: Cemig utilizes the IRR, payback period, capital cost and other risk / return indicators that may be necessary to search for and analyze new business development opportunities in the areas of electricity and natural gas generation, transmission and distribution, as well as for other activities directly or indirectly related to its corporate purpose.
- vi) To whom the results of the opportunity assessment are reported: the New Business Office is exclusively dedicated to the identification and assessment of business opportunities; when potential opportunities are identified, they are presented to the Executive Board and later to the Board of Directors.

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

Yes.

If there is integration between climate changes and business strategy:

Q2.2a Please describe the process and outcomes.

- i. The risks related to climate change are classified and prioritized in a risk matrix by the Corporate Risk Monitoring Committee and presented to the Executive Board. In parallel, the New Business Office, which is subordinate to the President, assesses the feasibility of new businesses from the perspective of the opportunities resulting from climate change. These risk and opportunity assessments are, therefore, presented to the company's senior management, which utilizes this information in the company's Strategic Planning development. Once the company's strategy has been defined and approved by the Executive Board, the other offices develop the planning of their activities.

- ii. The following aspects of climate change have influenced Cemig's strategy:
 - Opportunity to develop low carbon businesses: Cemig identifies business opportunities and chances of advantages in the market that arise mainly from its low carbon energy matrix, which materialize in i) the installation and retrofit of renewable energy source power plants in which Cemig already has expertise and ii) investment in new energy sources. In addition, climate change opens up new business opportunities for the company in energy efficiency services and in the supply of natural gas (a fuel with low GHG emission rates).
 - Risks resulting from regulatory changes: Cemig conducts environmental due diligence with regard to the acquisition of new assets (carbon risk assessment), with the goal of assessing the possible financial impact of increasing its GHG emissions with this asset, taking into account the possibility of the emission costs internalization due to new regulations, which assists in the decision-making related to the expansion of the business.
 - Need to mitigate climate change: Cemig, despite its low GHG emissions intensity, strives to reduce its emissions, including through the establishment of an emissions reduction goal.
 - Need to adapt to climate change: Cemig's generation systems feature a low GHG emissions intensity, as it is predominantly hydroelectric in nature, though it is subject to the consequences of climate change. Therefore, the company invests in improvements of the weather forecasting systems, in improvements of the infrastructure of its plants, transmission lines and distribution networks in order to cope with the consequences of these events and in improvements of the forecasts of water availability for its generation system.

- iii. There are many components of the Cemig's strategy that are influenced by climate change in the short term (up to 5 years). Cemig invests in state-of-the-art techniques and equipment that allows for a high degree of accuracy when

forecasting the intensity and location of storms, in order to mitigate interruptions in the electricity supply and to increase the safety of hydroelectric dam and reservoir operations. Additionally, in 2012 Cemig established a corporate emissions reduction goal: to reduce its GHG intensity (tCO₂e/MWh) by 8% by 2015 based on 2008 emissions levels.

- iv. There are many components of the Cemig's strategy that are influenced by climate change in the long term (more than 10 years). The need to consolidate low carbon energy matrices has guided technology R&D projects that may be implemented by Cemig on a large scale in the future, such as i) the development of the solarimetric atlas, with the goal of mapping energy potential and identifying the best sites for solar power plants in Minas Gerais State, ii) the generation of electricity at grid-connected photovoltaic facilities, know-how that is being pioneered developed by Cemig through the Sete Lagoas Solar Plant and Mineirão Solar projects and iii) the smart grid implementation.

In addition, recent acquisitions by Cemig demonstrate its position with regard to strengthening its focus on the expansion of renewable energy: the increase in its stake in Light and in Renova Energia (Cemig holds a stake in Renova through Light, which holds 21.99% of the total capital in Renova); Renova is a leader in the generation of contracted wind power in Brazil and one of the largest companies in the renewable energy segment, currently representing the Cemig's renewable energy expansion branch.

The climate change scenario opens up opportunities for new business. Cemig has a company, Efficientia S.A, that develops and implements technological solutions that promote the efficient energy use at its clients' facilities.

The influence of climate change on Cemig's short and long term strategy was communicated in 2011 through a public announcement¹ called "10 Climate Initiatives".

- v. The maintenance of a matrix predominantly renewable and the carbon risk assessment allow Cemig to be proactive with regard to the risks associated with an increase in the cost of electricity generation.

In addition, the development of new technologies, especially photovoltaic electricity generation, places Cemig at the vanguard in the electric sector, allowing for the

¹ Public announcement "10 Climate Initiatives". Available at http://www.cemig.com.br/pt-br/A_Cemig_e_o_Futuro/sustentabilidade/nossos_programas/mudancas_climaticas/Documents/CircularMudancasClimaticas.pdf.

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

- vi. The more substantial strategic decisions taken by Cemig in 2012 influenced by the business opportunities that are enhanced by climate change are described below:
- investment in electricity loss management in transmission and distribution networks: loss control is one of Cemig's strategic objectives and, in order to measure it, the Total Distribution Losses Index (IPTD – *Índice de Perdas Totais da Distribuição*) has been created. In 2012, the target for the indicator was set below those for the regulatory indices (12.07%);
 - additional acquisition 4.38% of Gasmig (natural gas supply);
 - approval of investments in the construction of a 1.2 MWp solar photovoltaic power plant at Mineirão Stadium in Belo Horizonte;
 - establishment of a partnership between Light and the Government of Rio de Janeiro State for the installation of photovoltaic panels at the Maracanã Stadium;
 - initiation of construction of a 3.3 MWp solar power plant in Sete Lagoas, which will be the largest photovoltaic power plant in the country;
 - initiation of construction of 4 SHPs (small hydroelectric plants) through the Minas Gerais SHP Program (*Senhora do Porto I and II, Dores de Guanhães e Jacaré* SHPs), with a total installed capacity of 44 MW.
 - repowering of the Igarapé Thermoelectric Plant: in 2012 work to repower the Igarapé Thermoelectric Plant was undertaken, leading to a lower emissions intensity for the plant (tCO₂ / MWh generated);
 - establishment of an agreement with *Energas Geração de Energia*, the company responsible for the installation of the power facility using biogas from Uberlândia Municipality's landfill, and Cemig will commercialize all the electricity generated during 4 years.

Q2.3 Do you engage in activities that could either directly or indirectly influence policy on climate change through any of the following? (tick all that apply)

- Direct engagement
 Trade associations
 Funding research organizations
 Other
 No

Q2.3b Are you on the Board of any trade associations or provide funding beyond membership?

Yes.

Q2.3c 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
Brazilian Corporate Council for Sustainable Development (CEBDS – <i>Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável</i>)	Consistent	Within CEBDS there is the Thematic Energy and Climate Change Chamber (CTClima – <i>Câmara Temática de Energia e Mudanças do Clima</i>), in which Cemig has a chair. CTClima represents the vision of the CEBDS member companies with regard to issues related to climate change, in debates and in the formulation of public policies with governments and other groups of interest. CTClima's mission is "to be an adequate forum so that companies understand their role within the context of climate change, assisting them to develop strategies that take advantage of opportunities and minimize risks and prepare them for a world with restrictions of emissions of greenhouse gases".	Cemig's representative at the Thematic Energy and Climate Change Chamber (CTClima) participates in meetings, discussions and debates and contributes, when applicable, with suggestions for the formulation of public policy.

Q2.3d Do you publically disclose a list of all the research organizations that you fund?

Yes².

Q2.3e Do you fund any research organizations to produce public work on climate change?

Yes.

Q2.3f Please describe the work and how it aligns with your own strategy on climate change.

² Cemig provides information on all the research projects that are being undertaken, organized by theme; details on the projects are available at: http://www.cemig.com.br/pt-br/A_Cemig_e_o_Futuro/inovacao/pesquisa_e_desenvolvimento/Paginas/pesquisa_e_desenvolvimento.aspx.

Cemig is financing the "Infrastructure for a low cost Smart Grid" research project, which is one of the initiatives undertaken by the company related to climate change that defines its strategy for mitigation and adaptation and its commitment to a low carbon economy. The company is installing smart grids, initially in the Sete Lagoas Municipality. This initiative will allow for the automation of grids, metering systems and distributed generation and storage of energy, thus contributing to the reduction of the electricity losses and, consequently, to the GHG emissions reduction. Despite the fact that smart grids are being discussed at a global level, it is still necessary to adequate legislation and to assess technical and economic issues from the point of view of the Brazilian reality, in order to maximize the benefits from the adoption of this technology. In 2012, a video containing information on the project was published on Cemig's website (http://www.cemig.com.br/pt-br/A_Cemig_e_o_Futuro/sustentabilidade/nossos_programas/Redes_Inteligentes/Paginas/default.aspx). The video assesses the environmental benefits of the installation of smart grids, which will allow the GHG emissions reduction in the grid.

The company realizes important innovations that have positive effects in climate change mitigation, such as solar heating and photovoltaic electricity generation systems. The list of all the research projects financed by Cemig and further details on such projects can be found at http://www.cemig.com.br/pt-br/A_Cemig_e_o_Futuro/inovacao/pesquisa_e_desenvolvimento/Paginas/pesquisa_e_desenvolvimento.aspx.

Q2.3h 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?

As described in the answer to question Q1.1, the person directly responsible for Cemig's Global Climate Change Strategy is the Vice-President Director. Therefore, the Vice-President Director's team assesses all activities in which the company directly or indirectly participates with regard to the development of public policies.

3. Targets & Initiatives

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

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

If there is intensity target:

Q3.1b Please provide details of your intensity target.

ID	Scope	% of emissions in scope	% reduction from base year	Metric	Base year	Normalized base year emissions (tCO ₂ e / MWh)	Target year	Comment
I-01	1	100%	8%	tCO ₂ e / MWh	2008	0.007801	2015	This target refers to the reduction in Scope 1 emissions related to the electricity generated by Cemig; thus, it is tCO ₂ / MWh produced.

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

ID	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	Comment
I-01	Increase	13.71%	-	-	Despite the reduction in GHG emissions per MWh produced by Cemig when the target is reached, the company is planning to expand its production in the order of 124% by 2015 in relation to 2008, leading to an increase in absolute Scope 1 emissions with the achievement of the target. By 2015, the increase in absolute emissions may occur due to increased operation of the Igarapé Thermoelectric Plant.

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

ID	% complete (time)	% complete (emissions)	Comment
I-01	57%	100%	<p>Scope 1 emissions fell significantly in comparison with 2008 emissions, reaching a level of 0.001393 tCO₂e / MWh generated by Cemig. Therefore, in 2012 the emissions target of 0.007177 tCO₂e / MWh for 2015 (8% reduction in relation to 2008) was achieved and surpassed. Igarapé Thermoelectric Plant was reactivated in 2012, which led to an increase in emissions in comparison with 2011. However, prior to this reactivation, the Igarapé Plant underwent a revitalization program that is expected to increase the average thermal efficiency by 1.407% in comparison with the average for 2007-2008. This thermoelectric plant operated for only 1 month in 2012.</p> <p>In addition, other initiatives to reduce Scope 1 emissions, such as the increased efficiency in the use of the company's fleet of vehicles and other actions, have also contributed to this significant reduction in emissions in comparison with 2008.</p>

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 use of the company's goods and/or services enable GHG emissions to be avoided by a third party:

3.2a Please provide details.

Efficientia S.A.: is a wholly-owned subsidiary of Cemig that implements energy efficiency projects, providing services for development and technical and financial feasibility of energy efficiency projects, implements energy cogeneration projects and offers consulting services aiming optimizing of the industry energy matrices, training in energy management and consulting services for certification in the ISO 50001 energy efficiency standard.

- i. In 2012 the Siderúrgica Plantar steel mill cogeneration project (5 MW), which uses blast furnace gases, was completed.
Also, in partnership with ArcelorMittal Bioflorestas, Cemig is developing and constructing systems for carbonization gas transport and for forest biomass waste utilization to generate electricity.
Efficientia also coordinates various projects together with the sugar-alcohol sector, utilizing sugar cane bagasse and managing the construction of new transmission lines and substations to connect the plants to the electric system;
- ii. Between 2004 and 2012, the accumulated emissions reductions from all the projects implemented by Efficientia reached a total of 11,385 tCO₂/year;

- iii. The electricity saved corresponded to 166,000 MWh/year. To calculate the emissions reduction, the annual emissions factor for the Brazilian Electric System (SIN) for 2012 was utilized, calculated for GHG inventories by the Ministry of Science, Technology and Innovation (MCTI – *Ministério de Ciência, Tecnologia e Inovação*)³, multiplied by the quantity of electricity saved;
- iv. The generation of Certified Emission Reductions (CERs) within the scope of the CDM was not considered in any of the projects implemented.

Intelligent Energy: is a program consisting of various multi-year and socio-environmental projects through which energy efficiency actions are undertaken in low income communities and non-profit and philanthropic institutions, thus promoting the rational use of energy.

- i. The Intelligent Energy Program encompasses three subprograms: *Energia do Bem*, *Conviver* and Ecoefficient City Halls.

Energia do Bem is focused on projects aimed at philanthropic and non-profit entities. In 2012 electric showerheads were replaced at 163 institutions for the elderly, along with 71 autoclaves and 8,805 light and lamp sets fixture at hospitals.

Conviver encompasses projects aimed at low-income consumers. In 2012 6,000 solar heating systems were installed and 218,439 lamps and 2,036 refrigerators were replaced, as were 426 family agriculture irrigation systems over 15 years old being used in the Jaíba Project.

Ecoefficient City Halls encompasses projects aimed at municipal energy management;

- ii. In 2012 the program avoided the emission of 3,222 tCO₂;
- iii. In 2012 the program allowed for an energy consumption reduction of 46,979 MWh. To calculate the emissions reduction, the annual emissions factor for the SIN for 2012, calculated by the MCTI^{Erro! Indicador não definido.}, was utilized, multiplied by the quantity of electricity saved during the year;
- iv. The generation of Certified Emission Reductions (CERs) within the scope of the CDM was not considered in the program.

Gasmig: is a Cemig subsidiary and the exclusive distributor of piped natural gas throughout Minas Gerais State. In addition, Gasmig has created the *Inovagás* project, which is aimed at serving clients through the rendering of energy efficient solutions, including the supply of natural gas and cogeneration, along with efforts to increase the utilization of natural gas in

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

hotels and shopping malls, participating in projects to replace equipment and rendering services.

- i. In 2012 Gasmig constructed 26 km of natural gas distribution pipelines in the Minas Gerais State, which now total 805 km spread throughout 40 municipalities in Minas Gerais. The company brings natural gas infrastructure to strategic regions in the State, allowing more carbon intensive fossil fuels to be replaced in manufacturing plants;
- ii. In 2012, the consumption of natural gas distributed by Gasmig avoided the emission of approximately 16,542,000 tCO₂e;
- iii. Gasmig monitors the quantity of natural gas supplied to the sectors it serves. The estimate for emissions reduction was performed based on the assumption that in the absence of natural gas distribution, industry would consume fuel oil (which corresponded to 93.89% of the natural gas consumed in 2012), vehicles would consume gasoline (3.82% of the natural gas consumed in 2012) and thermoelectric plants would utilize diesel oil (2.29% of the natural gas consumed in 2012). Utilizing the emissions factors, the net calorific values and the densities of the Brazilian GHG Protocol, emissions with natural gas (real scenario) and emissions in the case of utilization of fuel 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 Certified Emission Reductions (CERs) 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 CO₂e savings.

Stage of development	Number of projects	Total estimated annual CO ₂ e savings in metric tonnes CO ₂ e (only for rows marked *)
Under investigated	-	-
To be implemented*	-	-
Implementation commenced*	22	1,000
Implemented*	21	5,269
Not to be implemented	-	-

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

Activity type	Description of activity	Estimated annual CO ₂ e savings (metric tonnes CO ₂ e)	Annual monetary savings (R\$)	Investment required (R\$)	Payback period
Energy efficiency: Processes	<p>Nature of the activity: this comprises actions that are aimed at reducing technical electricity losses in the distribution system. These losses are inherent to the transport of electricity along the transmission and distribution equipment and lines. Of note among the actions undertaken in 2012 to control and minimize technical losses are:</p> <ul style="list-style-type: none"> • Reinforcements of the medium voltage/low voltage electric system and expansion and reinforcement of the high voltage (69 kV to 230 kV) sub transmission system; • Acquisition and installation of distribution transformers that utilize amorphous core technology, which reduces leakage losses by roughly 80%, in addition to reinforcing of the respective low voltage circuits; • Installation of 362 banks of fixed capacitors in the medium voltage electric system. <p>In 2012, it was achieved losses reduction of 38.0 GWh due to the installation of 362 banks of fixed capacitors banks on average and reduction of 3.64 GWh due to the replacement of 436 conventional transformers by transformers with amorphous core.</p> <p>The company's Scope 2 emissions are reduced (emissions associated with technical electricity losses are accounted for in Scope 2 of Cemig's inventory; losses are considered own consumption because they require the generation of this electricity).</p> <p>This initiative is voluntary in relation to external regulators. There is a target of 9.20% for technical losses established by ANEEL (National Electric Energy Agency – <i>Agência Nacional de Energia Elétrica</i>), which is mandatory for Cemig, though the initiatives described here are voluntarily adopted by the company with the goal of reaching this target.</p> <p>Expected lifetime of the initiative: 20 years.</p>	2,856	14.5 million	10.5 million	< 1 year
Energy efficiency: Processes	<p>Nature of the activity: in 2012, R\$ 13 million were spent on programs aimed at reducing non-technical losses through the inspection of 97,067 consumer units suspected of having illegal connections, with gains of R\$ 138 million (roughly 196 GWh), based on the potential for revenues from energy billed retroactively and energy added following regularization of the connection. Of note among the actions undertaken and the results achieved in 2012 are:</p> <ul style="list-style-type: none"> • High index that measures the effectiveness of selection of inspection targets: 34%; • 35% increase in energy added / 	1,056	5.4 million	13 million	1 – 3 years

	<p>inspection, thus confirming the efficiency of the process;</p> <ul style="list-style-type: none"> • Improvements to the target selection system; • Issuance of 56,622 billing notices for irregular consumption; • Regularization of 15,965 public lighting fixtures that were remaining lit during the day with a reduction in losses of 10.3 GWh (equivalent to R\$ 1.07 million); • Regularization of 2,120 clandestine connections representing a reduction in losses of 5.1 GWh (R\$ 2.06 million). <p>The company's Scope 2 emissions are reduced (emissions associated with non-technical electricity losses are accounted for in Scope 2 of Cemig's inventory; losses are considered own consumption because they require the generation of this electricity). This initiative is a GHG emission reduction measure, since when consumers are irregularly connected to the grid, they do not pay energy bills, which normally results in them consuming high amounts of electricity. With the regularization of these connections undertaken by Cemig, consumers begin paying for the electricity they consume, resulting in a drastic fall in consumption, which, consequently, reduces emissions. As a result, the following electricity consumption reduction figures were recorded in 2012:</p> <ul style="list-style-type: none"> • regularization of 15,965 public lighting fixtures that were remaining lit during the day with a reduction in losses of 10.3 GWh (equivalent to R\$ 1.07 million); • regularization of 2,120 clandestine connections representing a reduction in losses of 5.1 GWh or R\$ 2.06 million. <p>This initiative is voluntary in relation to external regulators. Expected lifetime of the initiative: it is not possible to estimate the lifetime of the initiative, since it does not involve the use of equipment, but rather measures such as visits to clients and the regularization of clandestine connections or public lighting fixtures.</p>				
<p>Low carbon energy installation</p>	<p>Nature of the activity: the Paracambi SHP (small hydro) entered into operation in 2012. It has an installed capacity of 25 MW and physical guarantee (a Brazilian measure that represents the power that certainly can be converted to electricity) of 20.34 MW, which represents an estimated generation of 178,178 MWh/year. Only 49% of the emissions reduction associated with the Paracambi SHP were considered in Cemig's CDP, since the SHP is 49% owned by Cemig. The company's Scope 1 emissions are reduced, since by expanding its electricity generation using low carbon plants, Cemig reduces its Scope 1</p>	<p>20</p>	<p>Confidential information</p>	<p>98 million</p>	<p>Confidential information</p>

	<p>emissions per MWh produced (to calculate the emissions reductions depicted in the column in the right, it was utilized the emission factor of Scope 1 tCO₂ per MWh produced by Cemig in 2011 and announced in the 2012 CDP). If the Scope 2 emissions reductions for Cemig's consumers are considered, utilizing the emission factor of the Brazilian grid, the emissions reductions are 3,185 tCO₂e (though the emissions reductions considered in the column at the side are Cemig's Scope 1 emissions). This initiative is voluntary in relation to external regulators.</p> <p>Expected lifetime of the initiative: 30 years.</p>				
Low carbon energy installation	<p>Nature of the activity: the Santo Antônio HPP (hydro) entered into operation in March 2012. In December 2012, 10 turbines had entered into commercial operation and by November 2015 the plant will have an installed capacity of 3,150 MW and a physical guarantee of 2,218 MW, which represents an estimated generation of 19,429,680 MWh / year.</p> <p>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. The company's Scope 1 emissions are reduced, since by expanding its generation of electricity using low carbon plants, Cemig reduces its Scope 1 emissions per MWh produced (to calculate the emissions reductions depicted in the column in the right, it was utilized the emission factor of Scope 1 tCO₂ per MWh produced by Cemig in 2011 and announced in the 2012 CDP). If the Scope 2 emissions reductions for Cemig's consumers are considered, utilizing the emission factor of the Brazilian grid, the emissions reductions are 133,255 tCO₂e (though the emissions reductions considered in the column at the side are Cemig's Scope 1 emissions).</p> <p>This initiative is voluntary in relation to external regulators.</p> <p>Expected lifetime of the initiative: 30 years.</p>	451	Confidential information	1.64 billion	Confidential information
Low carbon energy installation	<p>Nature of the activity: the Alto Sertão Wind Farm Complex entered into operation in 2012 and is constituted by 14 wind farms (which are considered as 14 different initiatives in the table in Q3.3a above) with 184 wind turbines, an installed capacity of 294 MW and a physical guarantee of 134 MWm, which represents an estimated generation of 1,173,840 MWh/year.</p> <p>5.7% of the emissions reductions associated with the Alto Sertão Wind Complex were considered in Cemig's CDP, since the Complex is owned by Renova (Light holds 21.99% of the total capital and Cemig holds 26.06% of the total capital in Light). The</p>	16	Confidential information	68.7 million	Confidential information

	<p>company's Scope 1 emissions are reduced, since by expanding its generation of electricity using low carbon plants, Cemig reduces its Scope 1 emissions per MWh produced (to calculate the emissions reductions depicted in the column in the right, it was utilized the emission factor of Scope 1 tCO₂ per MWh produced by Cemig in 2011 and announced in the 2012 CDP). If the Scope 2 emissions reductions for Cemig's consumers are considered, utilizing the emission factor of the Brazilian grid, the emissions reductions are 4,613 tCO₂e (though the emissions reductions considered in the column at the side are Cemig's Scope 1 emissions).</p> <p>This initiative is voluntary in relation to external regulators.</p> <p>Expected lifetime of the initiative: 20 years.</p>				
Transport: fleet	<p>Nature of the activity: the transport management found opportunities to optimize the logistics which resulted in the definitive reduction of 151 vehicles in the Cemig's fleet and in the plan to replace the currently used fuel by biodiesel, which calls for the replacement of over 270 vehicles in 2013. The company's Scope 1 emissions are reduced through the reduction in the burning of fossil fuels in its fleet of vehicles.</p> <p>This initiative is voluntary in relation to external regulators.</p> <p>Expected lifetime of the initiative: 5 years.</p>	870	Confidential information	Confidential information	Confidential information
Process emissions reductions	<p>Nature of the activity: installation of a smart grid in Sete Lagoas Municipality, which is an smart grid design research and development project with the ultimate goal is to develop the company's competence with regard to the installation of a smart grid throughout its entire operations network. The installation of the smart grid allows for greater efficiency in terms of GHG emissions in the supply of electricity, due both to the fact that consumers can manage their energy usage while it is being utilized and to the fact that Brazilian consumers can generate energy at their residences using photovoltaic panels, for example. However, these gains will be realized in the future following the installation of the system. The immediate gain is that, with the automation of the disconnection and reconnection of the supply of electricity, fewer of Cemig's employees, cars and motorcycles need to be dispatched for this purpose.</p> <p>The company's Scope 1 emissions are reduced through the reduction in the burning of fossil fuels in its fleet of vehicles.</p> <p>This initiative is voluntary in relation to external regulators.</p> <p>Expected lifetime of the initiative: 20 years.</p>	Expected reduction in emissions: still unknown	Confidential information	45 million	Confidential information

<p>Energy efficiency: Building services</p>	<p>Nature of the activity: with a focus on the efficient use of electricity and water, Cemig is modernizing its way of monitoring consumption of these resources at its head office in Belo Horizonte through the Integrated Automated Management System (SIGA – <i>Sistema Integrado de Gerenciamento Automatizado</i>). The System was developed through an R&D program in partnership with the Federal University of Minas Gerais (UFMG – <i>Universidade Federal de Minas Gerais</i>), the Federal Technological Education Center (CEFET-MG – <i>Centro Federal de Educação Tecnológica</i>) and Studies and Projects Financer (FINEP – <i>Financiadora de Estudos e Projetos</i>).</p> <p>The company's Scope 2 emissions are reduced through the reduction in electricity consumption at its head office.</p> <p>This initiative is voluntary in relation to external regulators.</p> <p>Expected lifetime of the initiative: as this is a new operational system and the result of an R&D initiative, the useful life is as yet unknown.</p>	<p>Expected reduction in emissions: still unknown</p>	<p>Confidential information</p>	<p>Confidential information</p>	<p>Confidential information</p>
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Q3.3c What methods do you use to drive investment in emissions reduction activities?

Method	Comment
<p>Compliance with regulatory requirements/standards</p>	<p>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. Therefore, Cemig has created Intelligent Energy (EI), a program focused on energy efficiency that is comprised of various multi-year and socio-environmental projects through which energy efficiency actions are undertaken in low income communities (in compliance with article 1, paragraph V of Law No. 9,991/2000, included by Law No. 12,212/2010) and in non-profit and philanthropic institutions.</p>
<p>Financial optimization calculations</p>	<p>Cemig incorporates GHG emission parameters during the prior assessment of the technical-economic feasibility evaluation for a new project, 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).</p>
<p>Internal finance mechanisms</p>	<p>The replacement of the vehicle fleet is performed using resources from the Company Investment Programs. Cemig has the directive to renew its vehicle fleet annually so that the average age of the vehicles does not exceed 5 years, which is the legal depreciation period established by the granting authority.</p>
<p>Internal price of carbon</p>	<p>Cemig assesses the risk of increased carbon emissions in its energy matrix and the financial impact of this risk by conducting environmental due diligence and sensitivity analyses in relation to the acquisition of new enterprises. This is assisting the Company in its decision-making processes with regard to the expansion of its business.</p>

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 reference	Attach the document
In mainstream financial reports (complete). More specifically in the Annual and Sustainability report (available on the Company's website).	Environmental Dimension	http://www.cemig.com.br/en-us/the_cemig/Pages/reports.aspx
In voluntary communications to the market regarding Cemig's participation in the ICO2 (complete)	Throughout the whole document	http://cemig.infoinvest.com.br/enu/10234/ComunicadoaoMercado_ICO2_2012_2013_ing_html/ComunicadoaoMercado_ICO2_2012_2013_ing.html
In other regulatory filings (complete)	Form 20F: Section: The Carbon Market", p. 53; section on Executive Board decisions, p. 12 of Annex 1	http://cemig.infoinvest.com.br/enu/10520/CEMIG20F2012_29042013_ing_fullversion.pdf
In voluntary communications (complete)	Throughout the whole document (GHG emissions inventory)	http://www.cemig.com.br/pt-br/A_Cemig_e_o_Futuro/sustentabilidade/nossos_programas/mudancas_climaticas/Documents/RELAT%C3%93RIO%20INVENT%C3%81RIO%20CEMIG%20-%202012%20-%20PORTUGU%C3%8AS%20-%20FINAL%20-%2008%2005%202013.pdf

Risks and Opportunities Module

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 changes in regulation
- (x) Risks driven by changes in physical climate parameters
- (x) 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	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact
RR-1	General environmental regulations, including planning	The adoption by Brazil of a voluntary national commitment, originally proposed at COP 15, by means of the National Policy for Climate Change (PNMC – <i>Política Nacional sobre Mudança do Clima</i>), with a voluntary reduction goal of between 36.1% and 38.9% in Brazilian GHG emissions forecast for 2020. The risks associated with the establishment of this commitment are related to the operational costs that will result from possible specific accords for the energy sector, along with possible sanctions for non-compliance with such accords any consequent legal and operational penalties.	Increased operational cost	1 – 5 years	Direct	Likely	Low – medium
RR-2	Carbon taxes	Despite having a low carbon energy matrix, Cemig operates a thermoelectric plant powered by fossil fuels, the operation of which may be impacted in the event that a carbon tax is established in Brazil. This tax may also constitute a risk in the event that Cemig plans to expand its electricity generation business using thermoelectric plants powered by fossil fuels in the future.	Increased operational cost	6 – 10 years	Direct	About as likely as not	Low – medium

RR-3	Cap and trade schemes	The establishment of a cap-and-trade GHG emissions trading market in Brazil may result in the need for greater planning by Cemig with regard to compliance with specific market regulations, especially as relates to the monitoring and verification of emissions.	Increased operational cost	6 – 10 years	Direct	About as likely as not	Low – medium
RR-4	General environmental regulations, including planning	With the goal of meeting Brazil's voluntary commitment for GHG emission reductions, Decree 7.390/2010 governs the development of Sector Plans, which must include specific emission reduction actions, indicators and goals and mechanisms for the verification that they are being met. For the energy sector, the Ten-Year Energy Plan (<i>Plano Decenal de Energia</i>) was developed, which calls for an increase in energy efficiency, the addition of installed electricity generation capacity through hydroelectric plants and alternative sources such as wind power, biomass and SHPs (small hydroelectric plants). This plan presents risks for Cemig since it establishes among its objectives the goal of maintaining emission intensity levels in 2020 at the same level recorded in the sector in 2005.	Reduction / disruption in production capacity	1 – 5 years	Direct	Likely	Medium
RR-5	Uncertainty surrounding new regulation	In recent international discussions regarding climate change (COP 17), it was decided that emerging market countries such as Brazil should come to have obligatory emission reduction targets beginning in 2020. Therefore, the establishment of the sector targets called for in the PNMC in order to meet the voluntary targets will be reinforced. In this sense, the measure will lead the energy sector to reduce its emissions through compensation via the acquisition of carbon offsets in an Emissions Trading Scheme or through internal reformulations. Such regulations also constitute a risk in the event that Cemig is interested in expanding its energy generation business utilizing thermoelectric plants.	Increased operational cost	1 – 5 years	Direct	More likely than not	Medium

RR-6	Uncertainty surrounding new regulation	To conduct an inventory of its GHG emissions, Cemig utilizes the ISO 14.064-1 and the GHG Protocol standards in order to guarantee the reliability of the data collected. With the establishment of an emission trading scheme, a carbon tax or other emissions reduction instruments, the adoption of other methodologies and norms may be needed when conducting corporate inventories. Thus, Cemig may have to adjust its current procedures in order to remain in compliance with any new regulations that may be adopted.	Increased operational cost	1 – 5 years	Direct	Unlikely	Low
RR-7	Other regulatory drivers	With the goal of proposing measures to encourage energy efficiency in the country, the Ministry of Mines and Energy has published the National Energy Efficiency Plan (PNEf – <i>Plano Nacional de Eficiência Energética</i>), which utilizes the National Climate Change Plan as one of its references and cites the mitigation of climate change as one of its objectives. In the PNEf an electric energy consumption reduction target of 10% has been adopted for 2030, with 2004 levels serving as the base consumption mark.	Reduced demand for goods / services	1 – 5 years	Direct	More likely than not	Low – medium

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.

RR-1 and RR-2

- i. The risks listed are comprised by Cemig's risk matrix and are managed by the Risk Management System (SGIR – *Sistema de Gerenciamento de Riscos*). The analysis of the financial implications is considered confidential by the company.
- ii. Cemig conducts assessments of the carbon risk as part of its due diligence activities, accounts for corporate GHG emissions through the company's emissions inventory and establishes GHG emission intensity reduction targets.
- iii. The costs associated are those that are related to the maintenance of the meteorological, dam safety and risk management teams.

RR-3 to RR-7

- i. The analysis of the financial implications is considered confidential by the company.
- ii. CEMIG monitors legal discussions at the federal, state and municipal levels.
- iii. The costs associated are those related to the maintenance of 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	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact
RPh-1	Change in precipitation extremes and droughts	Climate change may bring undesirable consequences for reservoirs in terms of their continuous silting, which may be accelerate (or, in an optimistic scenario, accelerate more slowly), depending on the changes in the pluviometric and hydrological regimes that will occur at each reservoir. This may reduce the lifetime of reservoirs and increase maintenance costs.	Reduction / disruption in production capacity	> 10 years	Direct	Unlikely	Medium
RPh-2	Other physical climate drivers	Imprecision in meteorological forecasts may impact Cemig's 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 energy distribution, for example to define the allocation of teams for emergency services due to weather-related variables affecting the distribution of energy. The other two (medium and long term) are used for the operation of the reservoirs, energy planning and commercialization. Therefore, if there is any imprecision in the meteorological forecasts, these activities will be impacted.	Other impact: impact on the company's forecasts and scenarios	> 10 years	Direct	About as likely as not	Medium
RPh-3	Change in precipitation extremes and droughts	Excessively heavy rains may cause structural damage to dams.	Reduction / disruption in production capacity	> 10 years	Direct	Very unlikely	High
RPh-4	Change in precipitation extremes and droughts	An energy matrix highly concentrated in hydroelectric sources, as is Cemig's, is very sensitive to possible changes in rainy and dry seasons. The main risk associated with the use of this resource lies in the	Reduction / disruption in production capacity	> 10 years	Direct	Unlikely	High

		variability of upstream flows to the dams, which can result in variations in energy production.					
RPh-5	Change in precipitation extremes and droughts	The intensity of natural events, such as rain, wind and thunderstorms, caused by climate change, may directly affect the electricity transmission and distribution equipment (lead to failures in power cables and the explosion of transformers). Such damage may result in interruptions in the transmission and distribution systems.	Reduction / disruption in production capacity	Current	Direct	Likely	Low – medium

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.

RPh-1

- i. The materiality analysis is conducted and is considered confidential by the company.
- ii. Reservoir levels are monitored. Additionally, the company is working on a strategic R&D project, which is national in scope, together with important research institutes such as Brazilian Spatial Research National Institute (INPE – *Instituto Nacional de Pesquisas Espaciais*), Federal University of the Rio Grande do Sul State (UFRS – *Universidade Federal do Rio Grande do Sul*) and Federal University of Itajubá (UNIFEI – *Universidade Federal de Itajubá*), which assesses the impact of climate change on the capacity of hydroelectric plants to generate energy. The company also participates in other research projects focused on its activities that are impacted by climate conditions, such as burning monitoring and prediction studies and the monitoring of atmospheric electric discharges. In addition, Cemig has been increasing the share of other forms of generation in its matrix, giving priority to those that are renewable in nature.
- iii. The costs associated are those that are related to the maintenance of equipment and the meteorological, dam safety and risk management teams, in addition to investments in R&D and in alternative forms of electricity generation.

RPh-2

- i. The materiality analysis is performed and is considered confidential by the company.
- ii. Risk monitoring is performed through the monitoring of the information generated at meteorological stations and through statistical weather forecasting models. In order

to prevent possible impacts on its business, Cemig utilizes modern techniques and equipment, such as the Storm Localization System (SLT – *Sistema de Localização de Tempestades*), Hydrometeorological Telemetry and Monitoring System (STH – *Sistema de Telemetria e Monitoramento Hidrometeorológico*), mathematical hydrological simulation models and weather and climate forecasts, thus minimizing the possibility of inaccuracies in its meteorological forecasts.

- iii. The costs associated are those related to the acquisition of equipment and the maintenance of this equipment and meteorological and risk management teams.

RPh-3

- i. The materiality analysis is performed and is considered confidential by the company.
- ii. Cemig constantly monitors and assesses the condition of its dams. This activity is part of the Dam Assessment and Classification Methodology and supports maintenance planning, with the goal of reducing the likelihood of failures, thus minimizing the physical risk to properties and to employees.
- iii. The costs associated are those related to the maintenance of equipment and of meteorological, dam safety and risk management teams.

RPh-4

- i. The materiality analysis is performed and is considered confidential by the company.
- ii. Cemig has pioneering processes to prevent and mitigate the risk of water resources scarcity, which gives the company a competitive and strategic advantage in terms of the approach to and preparation for climate change risks. The company has adopted a series of operative measures at its hydroelectric plants and reservoirs that is aimed at calculating the optimal generation for each plant, thus guaranteeing the best use for hydroelectric generation, without impacting other water uses in the hydrographic basin. Cemig monitors in real time the quantity of water available in rivers and at its facilities based on the data from the Hydrometeorological Telemetry and Monitoring System (STH – *Sistema de Telemetria e Monitoramento Hidrometeorológico*) with 168 telemetry stations with meteorological and hydrological data measurement sensors and the automatic calculation of natural events such as inflow, turbine outflow and spillway flow, on an hourly and daily basis. In addition, the series of flows is monitored and updated at control stations strategically defined by the company.
- iii. The costs associated are those related to the maintenance of equipment and of meteorological, dam safety and risk management teams.

RPh-5

- i. The materiality analysis is performed and is considered confidential by the company.
- ii. Cemig conducts systematic inspections of its networks and invests heavily in improvements to its electric system through the Distribution Development Program (PDD – *Programa de Desenvolvimento da Distribuição*), which includes the construction of new substations and feeders, the installation of automation equipment and the replacement of conventional networks with protected and insulated networks. The company is also preparing itself to better serve its clients through Speak with Cemig, Cemig SMS, the Virtual Agency and the Easy Cemig chain of service outlets. In addition, Cemig has improved its infrastructure with the acquisition of meteorological radar and the utilization of the Navigation Service Communication System (SCAN – *Sistema de Comunicação de Atendimento e Navegação*), which allows for permanent communication between teams from the Distribution Operations Center (COD – *Centro de Operação da Distribuição*) and those in the field, thus facilitating the dispatch of vehicles to perform services.
- iii. The risks associated are those related to the maintenance of teams tasked with containing this type of risk. In 2012, Cemig invested R\$ 120 million in improvements to and maintenance on distribution networks, lines and substations in the Belo Horizonte Metropolitan Region.

Q5.1e Please describe your risks that are driven by changes in other climate-related developments.

ID	Risk driver	Description	Potential impact	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact
RO-1	Changing consumer behavior	Consumers may reduce their electricity consumption, motivated by discussions and incentive programs within the scope of climate change mitigation or as a result of the utilization of other forms of energy, such as the replacement of electric energy with thermal solar energy to heat water for residential showers.	Reduction / disruption in production capacity	> 10 years	Direct	Unlikely	Medium

Q5.1f 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.

RO-1

- i. The potential financial implications of this possible change in behavior are unknown to Cemig.
- ii. and iii. Since the implications mentioned in item i. above remain unknown, methods have not been established and costs have not been stipulated for these actions.

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.

- (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

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

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact
OR-1	International agreements	International agreements, such as the Kyoto Protocol and the possible global agreement to be adopted from 2020, create opportunities for Cemig to undertake projects within the scope of the Clean Development Mechanism (CDM) and in other carbon offset programs.	Premium price opportunities	Current	Direct	Very likely	Medium
OR- 2	Carbon taxes	Charging for GHG emissions should encourage the replacement of polluting production processes by low-emission processes, thus stimulating the surpassing of the economic model driven by fossil fuels and the development of production activities with lower GHG emissions. When compares with other electric energy generation companies, Cemig's relative electric energy generation cost will be reduced.	Reduced operational costs	6 – 10 years	Direct	About as likely as not	Low – medium
OR-3	Emission reporting obligations	Cemig's current generation matrix is predominantly renewable. The existence of obligations to report emissions will provide evidence of its low GHG emission energy matrix, which may attract a larger number of investors to the company, in addition to improving its reputation.	Increased stock price (market valuation)	6 – 10 years	Direct	About as likely as not	Low
OR-4	Product efficiency regulations and standards	The establishment of energy efficiency standards implies the adoption by Cemig's clients (electricity consumers) of measures to reduce peaks	Reduced operational costs	Current	Indirect (Client)	Very likely	Medium

		in demand for electricity, thus allowing for greater regularity in the energy supply curve, which would optimize the utilization of the entire system and, consequently, of the company's operations.					
OR-5	Product labeling regulations and standards	In the event regulations are established that favor the acquisition of renewable energy (green energy), Cemig will benefit since it already has a renewable matrix and this situation is already recognized as a strategic advantage for the company.	Premium price opportunities	6 – 10 years	Direct	Likely	Low
OR-6	General environmental regulations, including planning	The National Climate Change Plan presents targets that are aimed at reducing GHG emissions in Brazil. Among the targets that impacts Cemig's business is the reduction in non-technical losses in electricity distribution in the sector to a rate of 1,000 GWh per year over the next 10 years. Non-technical losses are caused by irregular connections to the grid which, when reduced, lead to a greater number of consumers paying for the energy they consume.	Increased demand for existing products / services	1 – 5 years	Direct	Very likely	Medium
OR-7	Other regulatory drivers	The National Climate Change Plan presents targets aimed at reducing GHG emissions in Brazil. Among the targets that impact Cemig's business is the increase in the electricity supply from cogeneration, mainly utilizing sugar cane bagasse, to 11.4% of the total electricity supply in the country by 2030. Cemig may benefit from possible public policies designed to encourage the installation of such plants.	Increased production capacity	Current	Direct	About as likely as not	Medium – high
OR-8	Other regulatory drivers	The establishment of regulations in Brazil that obligates a reduction in GHG emissions would not significantly affect Cemig's business, since the company's operations already feature low emissions and it is planning to expand this clean matrix. Therefore, Cemig would have lower capital costs in relation to energy generation companies	Reduced capital costs	> 10 years	Direct	Very likely	Medium

		that have higher emissions.					
OR-9	Other regulatory drivers	With the goal of expanding the supply of low-emission electricity in the Brazilian grid, the government may encourage the establishment of more attractive lines of financing for the generation of renewable energy. For example, reduced spreads may constitute an opportunity to reduce the company's capital costs.	Reduced capital costs	1 – 5 years	Direct	Very likely	Medium
OR-10	Cap and trade schemes	The establishment of a cap-and-trade carbon market in Brazil could place Cemig as an important supplier of emission reduction certificates in the market, due to the fact that its low carbon energy matrix has already been established.	Increased stock price (market valuation)	6 – 10 years	Direct	Likely	Medium
OR-11	Other regulatory drivers	With the goal of proposing measures to encourage energy efficiency in the country, the Ministry of Mines and Energy has published the National Energy Efficiency Plan (PNEf – <i>Plano Nacional de Eficiência Energética</i>), which utilizes the National Climate Change Plan as one of its references and cites the mitigation of climate change as one of its objectives. In the PNEf an electricity consumption reduction target of 10% has been adopted for 2030, with 2004 levels serving as the base consumption mark. In order to ensure that this target is met, it is possible that the government may establish incentive policies for energy efficiency projects. Cemig may be able to utilize these incentives to increase energy efficiency in its own operations.	Other: Increase in production efficiency	1 – 5 years	Direct	More likely than not	Low - 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.

OR-1

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. Cemig's New Business Office promotes, coordinates, assesses and structures opportunities for the acquisition of new assets in all sectors and activities. In addition, the structuring of a new business requires that technical, economic-financial and environmental feasibility analyses be conducted in a coordinated manner with the related Offices in the company. In parallel, the Competitive Intelligence Center collects, analyzes, transfers and disseminates important knowledge and information in order to assist with the decision-making process.
- iii. The associated costs are those related to the maintenance of environmental, carbon credit generation and commercialization and alternative energy teams.

OR-2

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. Cemig assesses the financial impact of a carbon tax by conducting environmental due diligence and sensitivity analyses. At the moment, monitoring of opportunities is done through following legal discussions regarding the establishment of a carbon tax at the federal, state and municipal levels.
- iii. The costs associated are those related to the maintenance of risk management, environmental, carbon credit commercialization and alternative energy teams.

OR-3

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. With regard to reporting emissions, Cemig already conducts an annual GHG inventory, which is made available on the company's website. Thus, the company is already prepared to deal with this opportunity.
- iii. The costs associated are those related to the maintenance environmental teams and the hiring of consultants.

OR-4

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. Efficientia is a whole subsidiary of Cemig that, since 2002, has been implementing energy efficiency projects for Cemig's clients. The company renders development and technical and financial feasibility services for energy

efficiency projects for clients, implements energy cogeneration and utility services projects, offers consulting services for the optimization of companies' energy matrices, offers in-person training and provides consulting services for certification in the ISO 50001 energy efficiency norm. The energy efficiency projects implemented by the company provide, in addition to effective energy savings, a reduction in the load at grid peak hours, thus serving as demand-side management. Thus, Cemig would benefit from a higher degree of regularity in the energy supply curve, as well as from increased revenues for Efficientia from the sale of its services.

- iii. The costs associated are those related to the maintenance of environmental, meteorological, carbon credit commercialization and energy alternatives teams.

OR-5

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. Cemig's New Business Office promotes, coordinates, assesses and structures opportunities for the acquisition of new assets in all sectors and activities. In addition, the structuring of a new business requires that technical, economic-financial and environmental feasibility analyses be conducted in a coordinated manner with the related Offices in the company. In parallel, the Competitive Intelligence Center collects, analyzes, transfers and disseminates important knowledge and information in order to assist with the decision-making process.
- iii. The associated costs are those related to the maintenance of risk management, environmental, meteorological, carbon credit commercialization and alternative energy teams.

OR-6

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. Among the actions undertaken in 2012 aimed at reducing non-technical electricity losses in the distribution system are the 35% increase in the energy distributed / inspection ratio, improvements in the selection of targets, including new parameters for the generation of inspection orders, the digitalization of documents (Event and Inspection Term and photographs) and storage in an appropriate software system (Gedoc), regularization of public lighting fixtures and the regularization of clandestine connections.
- iii. In 2012, R\$ 13.03 million were spent on programs aimed at reducing non-technical losses, which translates into the inspection of 97,067 consumer units

suspected of being irregular, with gains of R\$ 138 million (roughly 196 GWh), considering the potential of collecting for energy billed retroactively and increased energy sales.

OR-7 to OR-11

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. Once they have been identified, the opportunities undergo a critical feasibility analysis, which includes the financial aspects, following which a decision is made on whether it is worth Cemig making the investment.
- iii. The associated costs are those related to the maintenance of 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	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact
OPh-1	Change in precipitation extremes and droughts	The 4 th IPCC report analyzes the scenarios for changes in precipitation patterns around the world and indicates that in the Southeastern and Southern regions of Brazil, where Cemig has the majority of its reservoirs, there may be fluctuations between the maintenance of and increases in water production. In virtue of this, and in accordance with this study, hydroelectric energy production may increase with climate alterations.	Increased production capacity	> 10 years	Direct	About as likely as not	High
OPh-2	Other physical climate opportunities	Increased temperatures may imply alterations in wind patterns, creating opportunities for wind farms.	Increased production capacity	> 10 years	Direct	About as likely as not	High

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.

OPh-1 and OPh-2

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. Cemig has specialists in Meteorology and Hydrology that, through the use of mathematical models, estimate precipitation and future flows upstream of its reservoirs. Based on the current availability and projections of future availability, the operation of the facilities is done in an optimized manner. The Hydrometeorological Telemetry System (STH – *Sistema de Telemetria Hidrometeorológica*) features 168 real time collection stations that collect climatological and hydrological data at strategic locations throughout the Minas Gerais State. The data received are processed by a software package, where calculations are made, the data and information are stored in a database and natural events can be displayed in a systematized manner. With the STH, Cemig has constant access to updated data on rainfall and water levels in rivers and reservoirs, thus allowing for fluctuations in water availability for the generation of electric energy.
- iii. The costs associated are those related to the maintenance of software licenses and meteorology teams.

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

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct / Indirect	Likelihood	Magnitude of impact
OO-1	Reputation	In a low carbon energy 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 13 years, since its creation and is part of the Efficient Carbon Index created by BMF&Bovespa and BNDDES.	Increased stock price (market valuation)	1 – 5 years	Direct	Very likely	Medium
OO-2	Changing consumer behaviour	The possible 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 / services	6 – 10 years	Direct	Very likely	Medium
OO-3	Changing consumer behaviour	The greater demand for energy mentioned in opportunity OO-2 above may be directly reflected in discussions regarding the search for low GHG emission energy alternatives and the consequent increase in the commercialization	Premium price opportunities	6 – 10 years	Direct	About as likely as not	Medium

		of renewable energy. Within this scenario, Cemig may be able to commercialize its low emission intensity electricity at a differentiated and competitive price in a low carbon energy market that may be established.					
OO-4	Other drivers	In a scenario in which meteorological forecasts would have an even more important role in the productive sectors and in society in general due to the higher number of extreme events, Cemig's robust meteorological forecasting service may represent an opportunity for new business for the company.	New products / business services	1 – 5 years	Direct	About as likely as not	Medium
OO-5	Other drivers	In the event that corporate investments in energy efficiency rise with the goal of reducing the consumption of electricity and the consequent reduction in GHG emissions, Cemig's subsidiary Efficientia may see an increase in demand for its services.	Increased demand for existing products / services	1 – 5 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.

OO-1

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. One of the methodologies that Cemig utilizes to assess its image and reputation among its stakeholders resulting from its actions related to climate change is the assessment of the degree of esteem, admiration, trust and empathy that the general public holds towards the company using the RepTrak™ Deep Dive methodology, which forms the Pulse reputation overall index. In 2011 the Brand and Reputation Committee was formalized. This committee analyzes the actions that are to be undertaken aimed at improving the company's performance in this area.
- iii. The costs are those related to the contracting of research and cost of maintaining the Committee (labor costs for committee members).

OO-2

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.

- ii. With the goal of preparing itself for an increased demand for energy, Cemig has been expanding the availability of its electricity distribution infrastructure by reinforcing and strengthening distribution substations, lines and networks in order to serve the growth in this market.
- iii. Of note in 2012 were the investments of R\$ 56 million in substations and distribution lines, featuring the addition of 66 MVA and 134 km of distribution lines, and of R\$ 2 million in the construction of medium and low voltage networks.

OO-03

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. Cemig has a personalized service structure, composed of relationship agents, visits to clients, daily contacts and permanently available contact staff. This structure is composed of two areas: one to serve clients that purchase and sell energy in the wholesale market (generation, commercialization and distribution agents) and another to serve final energy consumers (industry, commerce, public and private services, among others) that purchase energy for their activities.
- iii. The costs are those related to the maintenance of this team (team member labor costs).

OO-04

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. The company employs specialists in Meteorology and Hydrology that monitor various meteorological events using mathematical hydrology simulation and weather and climate forecasting models that utilize data on the formation of rain, storms and hail obtained from meteorological radar, the Storm Localization System (SLT – *Sistema de Localização de Tempestades*) and the Hydrometeorological Telemetry and Monitoring System (STH – *Sistema de Telemetria e Monitoramento Hidrometeorológico*).
- iii. The costs associated are those related to the maintenance of software licenses and the meteorology teams.

OO-05

- i. The analysis of the financial relevance of the opportunity is performed and is considered confidential by the company.
- ii. Efficientia is a wholly-owned subsidiary of Cemig that, since 2002, has been implementing energy efficiency projects for Cemig's clients. The company renders

development and technical and financial feasibility services for energy efficiency projects for clients, implements energy cogeneration and utilities services projects, offers consulting services for the optimization of companies' energy matrices, offers in-person training and provides consulting services for certification in the ISO 50001 energy efficiency norm. The energy efficiency projects implemented by the company provide, in addition to effective energy savings, a reduction in the load at grid peak hours, thus serving as demand-side management. Thus, Cemig would benefit from a higher degree of regularity in the energy supply curve, as well as from increased revenues for Efficientia from the sale of its services.

- iii. The costs associated are those related to maintenance of Efficientia's team.

Emissions Module

7. Emissions Methodology

Reference year:

2008.

The base year was recalculated due to the updating of the Brazilian GHG Protocol tool in 2012, currently updated to version v2012.0.1.

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

Base year	Scope 1 Base year emissions (metric tonnes CO ₂ e)	Scope 2 Base year emissions (metric tonnes CO ₂ e)
2008	287,307	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.

- Brazil GHG Protocol Programme
- IPCC Guidelines for National Greenhouse Gas Inventories, 2006
- ISO 14064-1
- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

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

Gas (global warming potential)	Reference
CO ₂ (1)	IPCC Second Assessment Report (SAR - 100 years)
CH ₄ (21)	
N ₂ O (310)	
SF ₆ (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	kg CO ₂ e per litre	Brazil GHG Protocol Programme
Natural gas	2.07	Other: kg CO ₂ e per m ³	Brazil GHG Protocol Programme
Other: Common Gasoline	2.269	kg CO ₂ per litre	Brazil GHG Protocol Programme
Diesel oil	2.671	kg CO ₂ per litre	Brazil GHG Protocol Programme
Aviation gasoline	2.232	kg CO ₂ per litre	Brazil GHG Protocol Programme
Liquefied petroleum gas (LPG)	2.9324	kg CO ₂ per litre	Brazil GHG Protocol Programme
Electricity	0.0686	kg CO ₂ per MWh	Ministry of Science and Technology (MCT), Brazil
Other: Air travel	0.1106 (long) 0.0983 (medium) 0.1753 (short)	Other: kgCO ₂ per passenger per 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

Q8.2 Please provide your gross global Scope 1 emissions figures in metric tonnes CO₂e.
53,567 tCO₂e.

Q8.3 Please provide your gross global Scope 2 emissions figures in metric tonnes CO₂e.
436,750 tCO₂e.

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?

No.

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
+/-3.5% (More than 2% but less than or equal to 5%)	Data gaps Data management	Between 51,692 and 55,442	+/-3.5% (More than 2% but less than or equal to 5%)	Other: Variability of the emission factors	Between 421,464 and 452,036

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

- Third party verification or assurance complete

If verification/certification is underway or has already been made:

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

100% (More than 90% but less than or equal to 100%)

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

Type of verification or assurance	Relevant standard	Attach the document
Reasonable assurance	ISO14064-3	<i>GHGEmissionsCemig2012_Verification</i>

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

- Third party verification or assurance complete

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

100% (More than 90% but less than or equal to 100%)

Q8.7b Please provide further details of the verification/assurance undertaken, and attach the relevant statements.

Type of verification or assurance	Relevant standard	Attach the document
Reasonable assurance	ISO14064-3	<i>GHGEmissionsCemig2012_Verification</i>

Q8.8 Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?

No. In 2012 emissions from the combustion of biomass totaled 1,959 tCO₂e.

9. Scope 1 Emissions Breakdown

Q9.1 Do you have Scope 1 emissions sources in more than one country?

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 ₂ e)
Cemig GT	27,350
Cemig D	13,630
Rosal Energia	6
Sá Carvalho	8
Efficientia	4
Cemig Services	113
Cemig Telecommunications	10
Ipatinga Thermoelectric Plant	0
Barreiro Thermoelectric Plant	12,446

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

GHG type	Scope 1 emissions (metric tonnes CO ₂ e)
CO ₂	48,928
CH ₄	222
N ₂ O	467
SF ₆	3,950

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

Activity	Scope 1 emissions (metric tonnes CO ₂ e)
Stationary combustion	37,283
Mobile combustion	12,322
Fugitive emissions	3,950
Fertilizer consumption	12

10. Scope 2 Emissions Breakdown

Q10.1 Do you have Scope 2 emissions sources in more than one country?

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 ₂ e)
Cemig GT	701
Cemig D	435,575
Rosal Energia	0
Sá Carvalho	0
Efficientia	0
Cemig Services	0
Cemig Telecommunications	472
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 ₂ e)
Electricity purchased	3,509
Technical losses in the grid	433,241

11. Energy

Q11.1 What percentage of your total operational spend in the reporting year was on energy?

More than 0% but less than or equal to 5%.

Q11.2 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	203,729
Electricity	51,161*
Heat	0
Steam	0
Cooling	0

* This figure does not include technical and non-technical losses of electricity in the grid (which were 6,317,000 MWh in 2012), since the instructions for this question requested that only electricity purchased and consumed by Cemig should be included (the electricity self-produced and consumed by the company are not to be included). However, for the Scope 2 emissions, emissions resulting from these losses of electricity are included.

Q11.3 Please complete the table by breaking down the total "Fuel" figure entered above by fuel type.

Fuels	MWh
Biodiesels (B100)	103
Liquified petroleum gas (LPG)	466
Dry natural gas	61,673
Aviation gasoline	1,874
Residual fuel oil	88,054
Diesel oil	39,127
Other: Anhydrous and hydrated ethanol	100
Other: Vehicular natural gas (VNG)	1
Other: Pure automotive gasoline	21
Other: Common gasoline (with the addition of hydrated ethanol)	11,100
Lighting kerosene	1,210

Q11.4 Please provide details of the electricity, heat, steam or cooling amounts that were accounted at a low carbon emission factor.

Basis for applying a low carbon emission factor	MWh associated with low carbon electricity, heat, steam or cooling	Comments
Grid connected low carbon electricity generation owned by company, no instruments created	38,420,105	Just 0.1% of the electricity generated by Cemig does not come from low carbon plants (this electricity that is not low carbon is generated at the Igarapé Thermoelectric Plant, powered by fuel oil); therefore, 99.9% of the electricity is generated at hydroelectric plants, wind farms and plants powered by process

		<p>gases. These plants are connected to the grid, nevertheless there are no low emission certificates for the electricity. This electricity is exported to the grid, then is not consumed by the company and thus Cemig does not generate any GHG emissions associated with this electricity consumption. All the electricity consumed by Cemig was accounted for as purchased from the grid, and then the emission factor for the national grid was used in the GHG emissions inventory.</p>
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12. Emissions Performance

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

Increased.

12.1a Please complete the table.

Reason	Emissions value (percentage)	Direction of change	Comment
Emissions reduction activities	2.48%	Decrease in emissions	Opportunities were found in transport management to optimize logistics, which resulted in a reduction of 870 tCO ₂ e in 2012. In addition, also in 2012, the management of electricity technical losses resulted in emissions reduction equal to 2,856 tCO ₂ e, and the management of non-technical losses resulted in emissions reduction equal to 1,056 tCO ₂ e. These initiatives are detailed in question Q3.3b.
Divestment	0.00%	No change	There was no divestment in Cemig businesses that could alter Scope 1 and 2 emissions within the boundary established for its inventory.
Acquisitions	0.00%	No change	There were no acquisitions of businesses by Cemig that could alter Scope 1 and 2 emissions within the boundary established for its inventory.
Mergers	0.00%	No change	There were no mergers in Cemig businesses that could alter Scope 1 and 2 emissions within the boundary established for its inventory.
Change in output	25.95%	Increase in emissions	The Igarapé Thermoelectric Plant, which is the unique Cemig's facility that generates electricity using fossil fuels (fuel oil), was repowered and returned to operation in 2012, after a 2-year stoppage for its renovation. The emissions associated with the operation of the Igarapé Thermoelectric Plant in 2012 were 24,344 tCO ₂ e. Its operation was responsible for a 12.64% increase in Scope 1 + 2 emissions in 2012 compared with 2011. Cemig's production of electricity increased from 33,926.123 GWh in 2011 to 38,443.220 in 2012. If all the other conditions had remained unaltered during these two years, and presupposing a linear increase in emissions from the increased electricity generation, this production increase would lead to an increase of 13.31% in Scope 1 + 2 emissions.
Change in methodology	117.79%	Increase in emissions	There was an increase in Scope 2 emissions due to the increase in the emission factor of the National Interconnected System (SIN – <i>Sistema Interligado Nacional</i>) from 0.0292 tCO ₂ /MWh in 2011 to 0.0686 tCO ₂ /MWh in 2012, within Scope 2 emissions in 2011 representing 87% of Scope 1 + 2 emissions.
Change in boundary	0.00%	No change	There were no alterations in the inventory's boundary for the Scope 1 and 2 emissions.
Change in physical operating conditions	0.00%	No change	No alterations in Cemig's physical operations conditions were assessed from the perspective of changes of Scope 1 and 2 emissions in 2012 compared with 2011.
Unidentified	13.23%	Increase in emissions	13.23% of the increase in Scope 1 + 2 emissions in 2012 compared with 2011 could not be properly traced and there are therefore no identified causes for them. All the other items in this table together add up to a 141.26% increase in emissions, and the total increase was 154.49%.

Other	0.00%	No change	No other alterations in Cemig's operations were assessed from the perspective of changes of Scope 1 and 2 emissions in 2012 in comparison with 2011.
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12.2 Please describe your gross combined Scope 1 and 2 emissions for the reporting year in metric tonnes CO₂e per unit currency total revenue.

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change
0.0000265610	mtCO ₂ e	Net operational revenues (R\$)	117.11%	Increase	This increase in emissions per unit of revenue in 2012 compared with 2011 is due mainly to the increase in Scope 1 and 2 emissions in 2012. This increase in emissions is due principally to the increase in the GHG emission factor for the Brazilian grid (over which Cemig has no control). Other factors responsible for this increase, though of lesser importance, were the increase in the production of electricity and the return to operation of the Igarapé Thermoelectric Plant, which is powered by fossil fuel. Cemig's net operational revenues rose by 17.21% during this period.

12.3 Please describe your gross combined Scope 1 and 2 emissions for the reporting year in metric tonnes CO₂e 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
58.5942139825	mtCO ₂ e	Full time equivalent employee	164.77%	Increase	This increase in emissions per full time equivalent employee in 2012 compared with 2011 is due mainly to the increase in Scope 1 and 2 emissions in 2012. This increase in emissions is due principally to the increase in the GHG emission factor for the Brazilian grid (over which Cemig has no control). Other factors responsible for this increase, though of lesser importance, were the increase in the production of electricity and the return to operation of the Igarapé Thermoelectric Plant, which is powered by fossil fuel. The number of employees changed unimpressively between 2011 and 2012, falling by 3.88%.

12.4 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
12.7543005660	mtCO ₂ e	MWh produced	124.59%	Increase	This increase in emissions per unit of electricity produced by Cemig in 2012 compared with 2011 is due mainly to the increase in Scope 1 and 2 emissions in 2012. This increase in emissions is due principally to the increase in the GHG emission factor for the Brazilian grid (over which Cemig has no control). Other factors responsible for this increase, though of lesser importance, were the increase in the production of electricity and the return to operation of the Igarapé Thermoelectric Plant, which is powered by fossil fuel.

13. Emissions Trading

Q13.1 Do you participate in any emissions trading schemes?

No, but the company anticipates doing so in the next 2 years.

Q13.1b What is your strategy for complying with the schemes in which you participate or anticipate participating?

International negotiations have recently had a large impact on the carbon market. In December 2012, the first commitment period of the Kyoto Protocol was closed and, during the Conference of the Parties, it was decided that the agreement would be renewed, though with a different configuration. The agreement ended up losing a lot of its power, the value of carbon credits fell substantially and, currently, it is not as advantageous to register projects through this program. The unstable international economic situation contributed to a reduction in the industry productivity, including carbon-intensive sectors and, consequently, in the demand for carbon credits.

As of 2012 Cemig had 11 projects registered within the scope of the CDM (Clean Development Mechanism) of the Kyoto Protocol, through which a total reduction of 1,072,113 tCO₂e is expected. These projects, despite the current uncertainty regarding the value of the associated credits within the scope of the Kyoto Protocol, demonstrate that Cemig undertakes voluntary and additional actions to reduce emissions and is thus prepared for possibly participating in an emissions trading scheme.

Within the national scope, the National Climate Change Policy (PNMC – *Política Nacional sobre Mudança do Clima*) establishes the Brazilian Emissions Reduction Market (MBRE – *Mercado Brasileiro de Reduções de Emissões*) as one of its main tools for reducing GHG emissions. This market is not yet a reality, but is expected to materialize in the near future. 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 expected 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.

The expansion of electricity generation at Cemig is being strategically planned so as to increase its installed capacity using low carbon sources. Cemig invests in the installation of new hydroelectric plants, including both SHPs (small hydroelectric plants - from 1 MW up to

30 MW) and HPPs (Hydroelectric Plants - over 30 MW) and in wind farms and has made a great effort to acquire pioneering know-how in the photovoltaic electricity generation with the intention of including this source in its generation matrix to a significant degree. In addition, Cemig has invested large amounts in improving the efficiency of its production process in terms of electricity losses in the distribution system. This is Cemig's largest source of GHG emissions. Thus, Cemig is preparing itself to be ready to participate in an emissions trading market that may be established in Brazil.

Other strategies that prepare Cemig for participation in emissions trading schemes are listed in the document "Cemig - 10 Climate Initiatives"¹, in which Cemig states its commitment to climate change issues. The most important initiatives with regard to this theme are electricity generation from renewable sources, implementation of energy conservation and efficiency projects, performance in the natural gas sector, investments in new energy sources (since they are low carbon sources), improvements in the efficiency of processes and reduction in transport emissions.

Q13.2 Has your company originated any project-based carbon credits or purchased any within the reporting period?

Yes.

Q13.2a Please complete the table.

Credit origination or credit purchase	Project type	Project Identification	Verified to which standard	Number of credits (metric tonnes CO ₂ e)	Number of credits (metric tonnes CO ₂ e): Risk adjusted volume	Credits retired	Purpose, e.g. compliance
Credit origination	Hydro	Project 3898: Guanhões Energia CDM Project, Minas Gerais, Brazil (JUN1123)	CDM (Clean Development Mechanism)	62,949 / year	51,618 / year	No	Compliance
Credit origination	Hydro	Project 3922: Baguari Hydropower Plant CDM Project Activity	CDM (Clean Development Mechanism)	65,532 / year	53,736 / year	No	Compliance
Credit origination	Hydro	Project 4788: Cachoeirão CDM Project (JUN1092)	CDM (Clean Development Mechanism)	23,444 / year	19,244 / year	No	Compliance
Credit origination	Hydro	Pipoca Small Hydropower Plant Project Activity	CDM (Clean Development Mechanism)	24,082 / year	19,747 / year	No	Compliance
Credit origination	Hydro	SHP Paracambi CDM Project	CDM (Clean Development Mechanism)	60,819 / year	49,871 / year	No	Compliance

		(JUN 1064), Brazil					
Credit origination	Other: Thermoelectric powered by blast furnace gases	Generation with Blast Furnace Gas of Siderpita (JUN 1060), Brazil	CDM (Clean Development Mechanism)	3,529 / year	2,894 / year	No	Compliance
Credit origination	Wind	Renova Area 1 Wind Power Project	CDM (Clean Development Mechanism)	150,801 / year	120,641 / year	No	Compliance
Credit origination	Wind	Renova Area 6-8 Wind Power Project	CDM (Clean Development Mechanism)	117,424 / year	93,939 / year	No	Compliance
Credit origination	Wind	Renova 2010 Wind Parks.	CDM (Clean Development Mechanism)	166,664 / year	133,331 / year	No	Compliance
Credit origination	Wind	Renova LEN 11 Wind Power Project	CDM (Clean Development Mechanism)	395,927 / year	316,742 / year	No	Compliance
Credit origination	Solar	Sete Lagoas Solar Power Plant	CDM (Clean Development Mechanism)	942 / year	772 / year	No	Compliance

14. Scope 3 Emissions

Q14.1 Please account for your organization's Scope 3 emissions, disclosing and explaining any exclusions.

Source of Scope 3 emissions	Evaluation status	Metric tonnes CO ₂ e	Methodology	Percentage of emissions calculated using primary data	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 fuels and electricity bought by Cemig have not been assessed, just as electricity losses in the transmission and distribution of the electricity consumed by Cemig have not been included. In addition, emissions from the generation of electricity bought by Cemig for resale have not been assessed. It is important to note, however, that the emissions from losses in the distribution and transmission systems for electricity produced by Cemig have been accounted for in Scope 2.
Upstream transportation and distribution	Relevant, calculated	2,146.62	i) Types and sources of data utilized, emission factors and GWP values (global warming potential of the gas): data on the total distance traveled by outsourced trucks for the transport of cargo were utilized. The emission factors for the fuel consumed (diesel) and the GWP values were obtained in the GHG Protocol Brazil calculation tool. ii) Description of the data quality of the reported emissions: these were obtained directly from all of Cemig's suppliers whose vehicles transported cargo for Cemig in 2012. iii) Description of the methodologies, assumptions and allocation methods utilized to calculate emissions: the calculations were performed using the GHG Protocol Brazil tool (version v2012.0.1).	100	-

Waste generated in operations	Not evaluated	-	-	-	-
Business travel	Relevant, calculated	1,953.00	<p>i) Types and sources of data utilized, emission factors and GWP values (global warming potential of the gas): data on the total distance traveled by Cemig employees in business air travel were utilized. The emission factors and the GWP values were obtained in the GHG Protocol Brazil calculation tool.</p> <p>ii) Description of the data quality of the reported emissions: the distances for all business air travel realized by all Cemig employees in 2012 were calculated.</p> <p>iii) Description of the methodologies, assumptions and allocation methods utilized to calculate emissions: the calculations were performed using the GHG Protocol Brazil tool (version v2012.0.1); in addition, data from Defra were utilized to calculate the distances between airports.</p>	100	-
Employee commuting	Relevant, calculated	727.34	<p>i) Types and sources of data utilized, emission factors and GWP values (global warming potential of the gas): data on the total distance traveled by Cemig employees on buses were utilized. The emission factors and the GWP values were obtained in the GHG Protocol Brazil calculation tool.</p> <p>ii) Description of the data quality of the reported emissions: the distances for all travel on buses realized by Cemig employees in 2012 were calculated, along with the type of vehicle utilized for this travel (home - work).</p> <p>iii) Description of the methodologies, assumptions and allocation methods utilized to calculate emissions: the calculations were performed using the GHG Protocol Brazil tool (version v2012.0.1).</p>	100	-
Upstream leased assets	Not evaluated	-	-	-	There are no data available to calculate emissions for leased goods with Cemig as the lessee.
Investments	Not evaluated	-	-	-	-
Downstream transportation and distribution	Relevant, calculated	15,312.51	<p>i) Types and sources of data utilized, emission factors and GWP values (global warming potential of the gas): data on the total fuel consumed by the vehicles of contractors that render electricity distribution services to Cemig were utilized. The emission factors and the GWP values were obtained in the GHG Protocol Brazil calculation tool.</p> <p>ii) Description of the data quality of the reported emissions: the contractors whose vehicles render operational and</p>	100	In 2012 Cemig began quantifying emissions from the vehicles of contractors that render operational and maintenance services related to distribution services. Of the 43 contractors contacted, 21 responded with information for the inventory.

			<p>maintenance services for the electricity distribution network supplied the data. Approximately half of the contractors supplied data for the calculation of GHG emissions from this source.</p> <p>iii) Description of the methodologies, assumptions and allocation methods utilized to calculate emissions: the calculations were performed using the Brazil GHG Protocol tool (version v2012.0.1).</p>		
Processing of sold products	Not relevant, explanation provided	-	-	-	The product sold by Cemig (electricity) is not processed as an intermediary product for the production of a good for final consumption; the electricity is an input to production processes, not an intermediary good. Therefore, this emissions source does not apply to Cemig.
Use of sold products	Relevant, calculated	5,321,732.75	<p>i) Types and sources of data utilized, emission factors and GWP values (global warming potential of the gas): data on the consumption of electricity generated by Cemig by final consumers were utilized. The emission factor for the Brazilian grid and the GWP values were obtained in the Brazil GHG Protocol calculation tool.</p> <p>ii) Description of the data quality of the reported emissions: the company closely monitors the data on electricity consumption by its clients.</p> <p>iii) Description of the methodologies, assumptions and allocation methods utilized to calculate emissions: the calculations were performed using the Brazil GHG Protocol tool (version v2012.0.1).</p>	100	The main source of Cemig's Scope 3 emissions is the consumption of electricity generated by the company by final consumers, which can be companies, commercial businesses or residences. Since the energy commercialized by Cemig is fed into the National Interconnected System, the emission factor for this system was utilized to calculate these emissions.
End of life treatment of products sold	Not relevant, explanation provided	-	-	-	The product sold by Cemig (electricity) does not undergo any end of life treatment, since it does not generate waste that needs to be treated or disposed of. Therefore, this source does not apply to Cemig.
Downstream leased assets	Not evaluated	-	-	-	-
Franchises	Not relevant, explanation provided	-	-	-	Cemig does not have franchises. Therefore, this emissions source does not apply to Cemig.

Q14.2 Please indicate the verification/assurance status that applies to your Scope 3 emissions.

- Third party verification or assurance complete.

If verification/certification is underway or has already been made:

Q14.2a Please indicate the proportion of your Scope 3 emissions that are verified/assured.

100% (More than 90% but less than or equal to 100%)

Q14.2b Please provide further details of the verification/assurance undertaken, and attach the relevant statements.

Type of verification or assurance	Relevant standard	Attach the document
Reasonable assurance	ISO14064-3	<i>GHGEmissionsCemig2012_Verification</i>

Q14.3 Are you able to compare your Scope 3 emissions for the reporting year with those for the previous year for any sources?

Yes.

If the answer is positive:

Q14.3a Please complete the table.

Sources of Scope 3 emissions	Reason for change	Emissions value (percentage)	Direction of change	Comment
Upstream transportation & distribution	Change in physical operational conditions	139.10%	Increase in emissions	The distance travelled by outsourced trucks to transport cargo increased from 1,959,000 km in 2011 to 4,684,050 km in 2012. If all other conditions remained unaltered over these two years for this emissions source, this increase in distance traveled would produce an increase in Scope 3 emissions for upstream transportation and distribution of 139.10%.
Downstream transportation and distribution	-	-	-	In 2012 Cemig started to quantify emissions from the vehicles of contractors that render operational and maintenance services related to distribution services. Therefore, this was the first time that the company accounted for downstream transportation and distribution emissions in Scope 3.
Use of sold products	Change in methodology	134.93%	Increase in emissions	The increase in the emission factor for the National Interconnected System (SIN - <i>Sistema Interligado Nacional</i>) from 0.0292 tCO ₂ /MWh in 2011 to 0.0686 tCO ₂ /MWh in 2012 means that the same level of consumption of electricity generated by Cemig in these two periods would represent emissions that were 134.93%

				higher from the consumers of this electricity in 2012, compared with 2011. Emissions from the consumption of electricity by Cemig's clients were responsible for 99.8% of the company's Scope 3 emissions in 2012.
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Q14.4 Do you engage with any of the elements of your value chain on GHG emissions and climate change strategies? (Tick all that apply)

- Yes, with suppliers
- Yes, with clients
- Yes, with other partners in the value chain
- No, the company does not engage

Q14.4.a Please give details of methods of engagement, your strategy for prioritizing engagements and measures of success.

Within the Carbon Management in the Value Chain Program (*Programa Gestão de Carbono na Cadeia de Valor*), a pilot project being run by the Brazilian Corporate Council for Sustainable Development (CEBDS – *Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável*), Cemig will, in 2013, incorporate GHG emission inventories from suppliers when constructing the company's information base. For this purpose, Cemig has invited 50 companies that stood out for the quality of the supply of goods and services and for the management of socio-environmental responsibility at the 2012 Cemig Supplier Awards. This award encourages the strategic partnership between suppliers and Cemig in order to achieve common objectives.

Cemig conducts training sessions with these suppliers with the goal of sensitizing them with regard to climate change and the need to conduct GHG inventories and provides training to help them to do so. By June 2013, the suppliers that have been trained will produce their inventories for inclusion in Cemig's information base.

The objective of the Program to Manage Carbon in the Value Chain is to facilitate and expand management of climate change issues among the main suppliers of the participating companies, encouraging the production and publishing of their GHG inventories, in accordance with the GHG Protocol Brazil methodology.

The Program to Manage Carbon in the Value Chain reinforces the importance of climate change issues to Cemig and is aligned with the company's public commitment, expressed in the document "10 Climate Initiatives". Engagement and the participation of Cemig's major

suppliers are necessary so the company can expand and improve the management of its GHG emissions.

14.4b 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	Confidential	Suppliers were invited to participate in the Program to Manage Carbon in the Value Chain at Cemig in 2013. These suppliers stood out for the quality of the supply of goods and services and for the management of socio-environmental responsibility at the 2012 Cemig Supplier Awards.

14.4c If you have data on your 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
The company does not have any data	Suppliers were invited to participate in the Program to Manage Carbon in the Value Chain at Cemig in 2013. Cemig conducts training sessions with these suppliers with the goal of sensitizing them with regard to climate change and the need to conduct GHG inventories and provides training to help them to do so. By June 2013, the suppliers that have been trained will produce their inventories for inclusion in Cemig's information base.

Supplement for Electric Energy Utilities

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	Star date	End date
2008	01/01/2008	31/12/2008
2012	01/01/2012	31/12/2012
2015	01/01/2015	31/12/2015

EU1 Global totals by 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	Nameplate capacity (MW)	Production (GWh)	Absolute emissions (metric tonnes CO ₂ e)	Emission intensity (metric tonnes CO ₂ e/MWh)
2008	6,572	33,413	239,275	0.0072
2012	6,747	38,443	36,802	0.0010
2015	8,103	41,297	167,078	0.0040

EU2 Individual country profiles

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

- Coal - Hard
- Lignite
- Oil & Gas (excluding CCGT)
- CCGT
- Nuclear
- Waste
- Hydro
- Other renewables
- Other

Complete the table below for the selected periods in question EU0.1 for oil & gas (excluding CCGT).

Year	Nameplate capacity (MW)	Production (GWh)	Absolute emissions (metric tonnes CO ₂ e)	Emissions intensity (metric tonnes CO ₂ e/MWh)
2008	131	205	239,275	1.1672
2012	131	23	24,356	1.0537
2015	131	202	157,340	0.7789

Complete the table below for the selected periods in question EU0.1 for hydro.

Year	Nameplate capacity (MW)	Production (GWh)
2008	6,387	32,777
2012	6,514	37,900
2015	7,869	40,572

Complete the table below for the selected periods in question EU0.1 for other renewables (wind).

Year	Nameplate capacity (MW)	Production (GWh)
2008	1	0
2012	50	129
2015	50	123

Complete the table below for the selected periods in question EU0.1 for other sources (blast furnace gas, tar and other waste gases generated in steel industrial processes).

Year	Nameplate capacity (MW)	Production (GWh)	Absolute emissions (metric tonnes CO ₂ e)	Emissions intensity (metric tonnes CO ₂ e/MWh)
2008	53	430	0	0
2012	53	391	12,446	0.0318
2015	53	400	9,738	0.0243

Enter the values for all the sources mentioned above to the country for the periods selected in question EU0.1.

Year	Nameplate capacity (MW)	Production (GWh)	Absolute emissions (metric tonnes CO ₂ e)	Emissions intensity (metric tonnes CO ₂ e/MWh)
2008	6,572	33,413	239,275	0.0072
2012	6,747	38,443	36,802	0.0010
2015	8,103	41,297	167,078	0.0040

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	R\$ 2,671 million	-	-

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	%	Year	Comment
Renewable electricity's contribution to EBITDA	-	40%	2020	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 give:	Monetary figure	%	End year of capex plan	Comment
Capex planned for renewable electricity development	Confidential information	Confidential information	2013	In the current Capex plan, substantial investments are planned for the Generation business, in which 98% of the electricity is generated from renewable sources.

Signature of answerer to CDP

Mr. Arlindo Porto Neto – Vice President Director