



Eletrobras

**Inventory of greenhouse gas
emissions**

base year 2010

June 2011



Inventory of Greenhouse Gas Emissions – base year 2010

Eletrobras Companies

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**Working Group on Greenhouse Gas Emissions (GT 3)
Environmental Subcommittee (SCMA)**

**Operation, Planning, Engineering and Environmental Committee
(Copem)
Superior Council of the Eletrobras System (Consize)**

Superior Council of the Eletrobras System – Consise

Operation, Planning, Engineering and Environmental Committee – Copem

Coordinator: Valter Luiz Cardeal de Souza – Eletrobras

Environmental Committee of the Eletrobras System - SCMA

Coordinator: Maria Regina de Araújo Pereira – Eletrobras

Executive Secretary: Anna Teixeira Amorim Laureano – Eletrobras

Climate Strategy Working Group – GT 3

Principal members

Alexandre Mollica (coordination) – Eletrobras Cepel

Maria Luiza Milazzo – Eletrobras

Luis Eduardo Piotrowicz – Eletrobras CGTEE

Ana Cláudia Santana de Almeida – Eletrobras Chesf

João Leonardo Soito – Eletrobras Furnas

Ralph Kronemberger Lippi – Eletrobras Eletronorte

Raimundo Moreira Lima Filho – Eletrobras Eletronuclear

Marisa Bender – Eletrobras Eletrosul

Josefran Martins da Silva – Eletrobras Amazonas Energia

Anderson Braga Mendes – Itaipu Binacional

Surrogate members

Frederico Monteiro Neves – Eletrobras

Sávio de Jesus Cordeiro Martins – Eletrobras Amazonas Energia

Silviani Fröhlich – Eletrobras Eletronorte

Georgia Penna de Araújo – Eletrobras Furnas

Alessandra Kepinski – Eletrobras Eletronuclear

Special collaboration

Anibal Rodrigues Ribeiro Silva – Eletrobras

Érica Vilela Pereira Kurihara – Eletrobras Eletronorte

Gilson de Oliveira Mota – Eletrobras Eletronorte

Data processing and compilation

Alexandre Mollica – Eletrobras Cepel

Frederico Monteiro Neves – Eletrobras

Coordination and final editing Maria Luiza Milazzo – Eletrobras

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Executive summary

The Inventory of Greenhouse Gas Emissions of the Eletrobras Companies (edition 2011) represents the fulfillment of the commitment by the companies to inventory their emissions annually.

In this document, the information corresponds to 2010 and covers the following gases that cause greenhouse gas emissions (GHG):

- Carbon Dioxide (CO₂),
- Methane (CH₄),
- Nitrous Oxide (N₂O) and
- Sulfur Hexafluoride (SF₆).

These emissions were calculated on the basis of the thirteen Eletrobras companies: CGTEE, Furnas, Chesf, Eletronorte, Eletronuclear, Eletrosul, Amazonas Energia, Itaipu Binacional, Cepel, Eletrobras Distribuição Rondônia, Eletrobras Distribuição Piauí, Eletrobras Distribuição Acre and the holding company itself.

As in the previous editions, this inventory adheres to IPCC methodology (2006) and Greenhouse Gas Protocol guidelines (WRI, 2004) - GHG Protocol¹, but presents important additions in regards to the information contained therein:

- ✓ Inclusion of three more companies – Eletrobras Distribuição Rondônia, Eletrobras Distribuição Piauí and Eletrobras Distribuição Acre (electricity);
- ✓ Increase in Scope 1: other stationary sources (LPG, natural gas, diesel for the generator groups and auxiliary boilers) and fugitive emissions from fire extinguishers;
- ✓ Increase in Scope 2: emissions related to electricity transmission losses;
- ✓ Inclusion of an item from Scope 3 (emissions in regards to Independent Power Producers - IPPs);
- ✓ Reporting the data coverage percentage.

In accordance with GHG Protocol guidelines, the emissions that were estimated in this inventory correspond to:

- From Scope 1 (direct emissions): stationary sources (thermoelectric power plants and diesel for the generator groups), other stationary sources (LPG and natural gas used in kitchens and laboratories); mobile sources (or for vehicles) and fugitive emissions (sulfur hexafluoride - SF₆ and gas consumed in fire extinguisher refills).
- From Scope 2 (indirect emissions): electricity purchased from distribution networks and transmission losses.

¹ GHG Protocol: a corporate accounting and reporting standard for greenhouse gas emissions, launched in 1998 and revised in 2004, that is internationally recognized and currently the most widely-used tool worldwide by companies and governments in order to understand, quantify and manage their emissions.

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- From Scope 3 (indirect emissions): emissions from contracts with IPPs (independent power producers).

In regards to data coverage, 100% of the emissions were covered for thermoelectric power plants, fire extinguishers, independent power producers and electricity purchase contracts.

Emissions corresponding to electricity transmission losses were calculated based on information provided by the transmission department of the holding company which, by means of a working group, established one single methodology and consolidated the data received from the companies. The losses in the distributors' networks have not yet been calculated.

An important change was made in relation to the classification of the sources by scope. As of this edition, the emissions resulting from thermal generation by Independent Power Producers (IPPs), whose energy is purchased by Eletrobras Amazonas Energia and Eletrobras Distribuição Rondônia and resold to final consumers, is now quantified under Scope 3 and, therefore, separate from emissions in regards to the thermoelectric base of the Eletrobras companies, which is accounted for under Scope 1.

The total GHG emissions of Eletrobras companies in 2010 are equal to **8,666,945** tCO₂e (tons of CO₂ equivalent). Of this total, the largest share comes from stationary sources² (large, medium and small-scale thermal generation), at 4,883,342 tCO₂e, which represents 56.3% of total emissions. Also in Scope 1, direct emissions related to SF₆ emissions from electrical equipment corresponded to 1.76% of the total and may be subject to objective actions in order to reduce them. In Scope 2, it is important to note that emissions related to transmission losses represent 6.2% of the total emissions inventoried.

² Thermoelectric power plants attached to the National Interconnected System (SIN) are dispatched, in other words, generation energy according to stipulations from the National Electricity System Operator (ONS). Thus, their emissions are a consequence of the amount of energy generated through the operating rules established by the ONS. The thermoelectric power plants of the SIN do not operate in the base; they are complementary to the dispatch of the hydroelectric power plants.

Inventory of Greenhouse Gas Emissions – base year 2010
GHG Emissions of the Eletrobras Companies - base year 2010 (tCO₂e)

COMPANY	Scope 1 (tCO ₂ e)	Scope 2 (tCO ₂ e)	Scope 3 (tCO ₂ e)	SUBTOTAL (tCO ₂ e)	(%)
CGTEE	1,340,735.35	64.23	n.a.	1,340,799.59	15.47
Chesf	25,828.45	255.98	n.a.	26,084.43	0.30
Furnas	101,403.24	3,991.60	n.a.	105,394.84	1.22
Eletronorte	490,206.77	232.34	n.a.	490,439.11	5.66
Eletronuclear	1,122.57	6,782.97	n.a.	7,905.53	0.09
Eletrosul	10,464.29	883.24	n.a.	11,347.53	0.13
Amazonas Energia	3,069,859.99	3,517.50	1,567,690.97	4,641,068.47	53.55
Itaipu	9,077.93	114.09	n.a.	9,192.01	0.11
Cepel	737.25	221.66	n.a.	958.90	0.01
Eletrobras Holding	56.84	271.69	n.a.	328.54	0.00
Ceron	808.57	20.76	1,395,437.59	1,396,266.92	16.11
Eletroacre	278.71	55.01	95,699.89	96,033.61	1.11
Cepisa	3,223.44	168.05	n.a.	3,391.49	0.04
Transmission losses		537,734.82		537,734.82	6.20
SUBTOTAL (tCO₂e)	5,053,803.40	554,313.94	3,058,828.45	TOTAL (t CO₂e)	8,666,945.79
(%)	58.31	6.40	35.29		

N/A = not applicable; N/av = not available data; a.g. = amount reported to the group of companies

Emission Intensity of the Eletrobras Companies - GHG Emissions by net generation (MWh) - base year 2010

Eletrobras Companies	Emissions	Total Net Generation	Emissions / Total Net Generation
	(tCO ₂ e)	(MWh)	(tCO ₂ e / MWh)
CGTEE	1,340,799.59	612,516	2.1890
Chesf	26,084.43	44,162,411	0.0006
Furnas	105,394.84	38,352,300	0.0027
Eletronorte	490,439.11	40,323,160	0.0122
Eletronuclear	7,905.53	14,543,807	0.0005
Eletrosul	11,347.53	N/A	-
Amazonas Energia	4,641,068.47	5,704,259	0.8136
Itaipu	9,192.01	42,985,000	0.0002
Cepel	958.90	N/A	-
Eletrobras	328.54	N/A	-
Rondônia	1,396,266.92	N/A	-
Acre	96,033.61	N/A	-
Piauí	3,391.49	N/A	-
TOTAL*	8,666,945.79	186,620,693	0.0464

Source: Total Net Generation (MWh): Eletrobras Generation Engineering Department - EGG

* The amount of emissions due to transmission losses was added to this total.

Except for the companies that play a more important role in thermoelectric generation, the emission intensity of the Eletrobras companies (quantity of GHG emissions by generated energy) is very small. In the group of Eletrobras

Inventory of Greenhouse Gas Emissions – base year 2010

companies, this ratio is extremely positive, indicating mostly clean energy production.

Annual GHG Emissions of the Eletrobras Companies (estimated in tCO₂e)

Eletrobras Companies	2003	2004	2005	2006	2007	2008	2009	2010
CGTEE	1,984,630	2,298,340	2,525,610	2,631,520	2,196,730	1,497,570	1,483,830	1,340,799.59
Chesf	224,730	54,280	35,460	3,560	45,090	594,070	652,680	26,084.43
Furnas	394,780	170,550	149,880	4,110	24,940	144,440	114,730	105,394.84
Eletronorte	1,187,350	2,298,340	1,882,750	1,116,700	1,584,510	1,630,150	1,667,670	490,439.11
Eletronuclear	2,610	1,484,250	2,280	3,190	3,140	2,650	6,070	7,905.53
Eletrósul	N/A	N/A	N/A	N/A	N/A	N/A	8,690	11,347.53
Amazonas Energia	789,230	816,730	1,170,350	930,300	1,066,830	1,231,560	4,002,700	4,641,068.47
Itaipu	N/av	N/av	N/av	N/av	N/av	N/av	16,310	9,192.01
Cepel	N/av	N/av	N/av	N/av	N/av	N/av	1,070	958.90
Eletrobras	N/A	N/A	N/A	N/A	N/A	N/A	180	328.54
Rondônia	N/A	N/A	N/A	N/A	N/A	N/A	N/av	1,396,266.92
Acre	N/A	N/A	N/A	N/A	N/A	N/A	N/av	96,033.61
Piauí	N/A	N/A	N/A	N/A	N/A	N/A	N/av	3,391.49
Transmission Losses								537,734.82
Eletrobras Companies	4,583,340	4,826,470	5,766,330	4,689,370	4,921,240	5,100,450	7,366,540	8,666,946

Note: 1) N/A = not applicable; N/av = not available

Average emission intensity (tCO₂/MWh) of the electric power sector

	tCO ₂ /MWh
World¹	0.520
OECD*¹	0.440
Other countries¹	0.600
Eletrobras Companies²	0.046

* OECD members are high-income economies with a high Human Development Index (HDI) and are considered developed countries, with the exception of Mexico, Chile and Turkey.

¹ Amounts in relation to 2008. Source: International Energy Agency (IEA). Climate and Electricity Annual, 2011.

² Amounts in relation to 2010.

Presentation

In line with the Sustainability Policy of the Eletrobras companies and in compliance with Board of Executive Officers Resolution No. 1262, from 2010, which establishes a commitment to perform a yearly inventory of their greenhouse gas emissions, this document presents the results obtained for the Inventory of Greenhouse Gas Emissions of the Eletrobras companies for 2010.

As in previous editions, this inventory adheres to IPCC methodology (2006) and Greenhouse Gas Protocol guidelines (WRI, 2004) - GHG Protocol, but presents important additions in regards to the information contained therein:

- ✓ Inclusion of three more companies – Eletrobras Distribuição Rondônia, Eletrobras Distribuição Piauí and Eletrobras Distribuição Acre (electricity);
- ✓ Increase in Scope 1: other stationary sources (LPG, natural gas, diesel for the generator groups and auxiliary boilers) and fugitive emissions from fire extinguishers;
- ✓ Increase in Scope 2: emissions related to electricity transmission losses;
- ✓ Inclusion of an item from Scope 3 (emissions in reference to IPPs – Independent Power Producers).
- ✓ Reporting the data coverage percentage;

In this document, the information includes the emissions of the following gases that cause the greenhouse gas effect (GHG): Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O) and Sulfur Hexafluoride (SF₆). These emissions were calculated on the basis of the thirteen Eletrobras companies: CGTEE, Furnas, Chesf, Eletronorte, Eletronuclear, Eletrosul, Amazonas Energia, Itaipu, Cepel, the holding company, Rondônia, Piauí and Acre.

All participants and employees who worked on preparing this document are listed in the credits thereof.



Inventory of Greenhouse Gas Emissions – base year 2010

Objective

The goal of the Inventory of Greenhouse Gas Emissions of the Eletrobras Companies for 2010 is to identify and account for greenhouse gas emissions that the Eletrobras companies were responsible for during this period, utilizing IPCC methodology (2006) and Greenhouse Gas Protocol guidelines (WRI, 2004), that have been adopted by most companies in the world which seek to improve their environmental management systems and corporate sustainability.

Systematically improving the quality of this information makes it easier to propose effective measures for the overall goal which is the management of these emissions.

Inventory

In this 2011 edition of the inventory, information was collected from 2010 (base year) and, in accordance with GHG Protocol guidelines and under recommendations to increase the scope established in previous inventories, the following emissions were tabulated:

- From Scope 1 (direct emissions): stationary sources (thermoelectric power plants and diesel for the generator groups), other stationary sources (LPG and natural gas used in kitchens and laboratories); mobile sources (or vehicular) and fugitive emissions (Sulfur Hexafluoride - SF₆ and gas consumed in fire extinguisher refills).
- From Scope 2 (indirect emissions): electricity purchased from distribution networks and transmission losses.
- From Scope 3 (indirect emissions): emissions deriving from contracts with IPPs (Independent Power Producers).

Indirect emissions corresponding to electricity supply contracts, as per the same guidelines, are classified as "Other Indirect Emissions"³.

It is recommended in the same guideline that emissions from thermal generation by independent power producers (IPPs) should be allocated under Scope 3. Thus, the energy purchased from these IPPs by the public utilities Eletrobras Amazonas Energia and Eletrobras Distribuição Rondônia and resold to final consumers is now quantified under Scope 3 and, therefore, separate from emissions in regards to the thermoelectric base of the Eletrobras companies (Scope 1)⁴.

In regards to data coverage, 100% of the emissions were covered for thermoelectric power plants, fire extinguishers, independent power producers and electricity purchase contracts.

Emissions corresponding to electricity transmission losses were calculated based on information provided by the transmission department of the holding company which, by means of a working group, established one single methodology and consolidated the data received from the companies. The losses in the distributors' networks have not yet been calculated.

³ Chapter 4, page 28 of the volume on Specifications of the Brazilian GHG Protocol Program

⁴ For previous years, an erratum needs to be prepared appropriately allocating this portion of emissions.

1. Premises and procedures adopted

- The information needed to prepare the inventory was gathered in each of the companies by their respective representatives in the GT 3 - Climate Strategy Working Group created within the SCMA – Environmental Subcommittee of the Eletrobras Companies.
- For obtaining the data, each company was asked to fill out electronic spreadsheets specially prepared for this purpose, based on GHG Protocol specifications.
- The designing of the spreadsheets, the data consistency evaluation and the results analysis were conducted by the Eletrobras CEPEL GT 3 representative.
- The consolidation of the information was done by the GT 3 coordination and the preparation of the text by the Eletrobras Environmental Department – EGA.
- The methodology of the Intergovernmental Panel on Climate Change (IPCC 2006) was adopted.
- With regards to organizational boundaries, as in previous years, was prepared based on operational control⁵.
- Thermoelectric power plants attached to the National Interconnected System (SIN) are dispatched according to stipulations from the National Electricity System Operator (ONS). Thus, their emissions are a consequence of the amount of energy generated through the operating rules established by the ONS. These operating rules are not discussed in this inventory.
- The information obtained does not cover all the units of the Eletrobras companies.
- The emission factors for petroleum-based fuels in Brazil are different from those used internationally due to the requirement to add a fraction of sugarcane ethanol to these fuels, which reduces its pollution potential and modifies its carbon emission when burned.
- The emission factors used were taken from the *Initial National Communication of Brazil to the United Nations Framework Convention on Climate Change*.

⁵ In the *operational control* approach, an organization is responsible for 100% of the GHG emissions from the units over which it has operational control and is not accountable for those arising from operations in which it only has an equity share. Having operational control over a unit/operation is based on the fact that the organization – or one of its subsidiaries – has absolute authority to introduce and implement policies regarding the operation in question.

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The value of the energy content of fuel consumed was calculated on the basis of conversion factors listed in the National Energy Balance - BEN 2008 (base year 2007).

- Except for the IPPs, indirect emissions from Scope 3, such as air travel for work purposes, inland logistics, suppliers and others were not tabulated in the final result of the Eletrobras companies.

Evolution of the content and coverage of the GHG Inventories of the Eletrobras companies

	GHG Inventory 2008 Edition	GHG Inventory 2009 Edition	GHG Inventory 2010 Edition	GHG Inventory 2011 Edition
Unity	Gg CO2e	Gg CO2e	t CO2e	t CO2e
Coverage	Only 2005	From 2003 to 2008	2009	2010
Approach	Operational Control (GHG Protocol)	Operational Control (GHG Protocol)	Operational Control (GHG Protocol)	Operational Control (GHG Protocol)
Methodology	IPCC 2006	IPCC 2006	IPCC 2006	IPCC 2006
Content	Only part of Scope 1: Direct emissions from stationary sources (thermoelectric plants)	Only part of Scope 1: Direct emissions from stationary sources (thermoelectric plants)	Scope 1: Direct emissions from stationary sources (thermoelectric plants), mobile sources, fugitive SF6 emissions Scope 2: emissions for the quantity of energy bought from the grid	Scope 1: Direct emissions from stationary sources (thermoelectric plants), mobile sources, fugitive emissions (SF6 and fire extinguishers), other fixed sources (LPG, natural gas, diesel for the generator groups and auxiliary boilers) Scope 2: emissions for the quantity of energy bought from the grid, transmission losses Scope 3: independent power producers (IPPs) Other sources: electric energy contracts
Gases	CO ₂ CH ₄ N ₂ O	CO ₂ CH ₄ N ₂ O	CO ₂ CH ₄ N ₂ O SF ₆	CO ₂ CH ₄ N ₂ O SF ₆

- Tests for collecting data were conducted for recording direct fugitive emissions of refrigerant gases and indirect emissions resulting from air travel for work purposes.

In the case of air travel for work purposes, the test for collecting this data in the companies showed that each one still adopts a different method for booking air travel. For this reason, it was not possible to adopt an appropriate methodology and sufficient data coverage so that this portion of Scope 3 could be safely included within the totality of Scope 3 of the inventory. In this test phase, only domestic air travel was taken into account.

- In the case of fugitive emissions of refrigerant gases, a portion of Scope 1, the tests for collecting information revealed that there is a

Inventory of Greenhouse Gas Emissions – base year 2010

huge range of refrigeration devices, with different annual consumptions, and an extensive list of gases to be taken into account for this measurement. The goal is to adopt measures that would result in systematically obtaining this data in the companies so that this information can be included in future inventories.

Emissions corresponding to electricity transmission losses were calculated based on information provided by the transmission department of the holding company which, by means of a working group, established one single methodology and consolidated the data received from the companies. The losses in the distributors' networks have not yet been calculated.

- Emissions from land use or the balance of emissions (taking into account sources and sinks) in the areas where Eletrobras companies have business ventures were not taken into account.
- Likewise, emissions from hydroelectric reservoirs in enterprises belonging to Eletrobras companies were not considered, since so far no scientific consensus exists in regards to a methodology that would make it possible to estimate GHG emissions for these reservoirs and calculate the balance of emissions (or net emissions) from water bodies.
- This inventory has not been verified by an independent third party, nevertheless all the information and calculation logs, in addition to the identification of data sources, were archived for possible later verification.

2. Results by company

The Eletrobras companies are quite different from each other, either due to the nature of their activities, their area of operation, or by their size and number of units⁶. This diversity is reflected in the results of this inventory in terms of the volumes of greenhouse gases from each of the companies.

	Eletrobras companies	Characteristics
1	CGTEE	thermoelectric generation using coal
2	Chesf	hydroelectric and thermoelectric generation (gas and diesel oil) + transmission
3	Furnas	hydroelectric and thermoelectric generation (gas and diesel oil) + transmission
4	Eletronorte	hydroelectric and thermoelectric generation (diesel oil) + transmission
5	Eletronuclear	thermonuclear generation
6	Eletrosul	transmission + wind generation
7	Amazonas Energia	hydroelectric and thermoelectric generation (fuel oil and diesel) + distribution
8	Itaipu Binacional	hydroelectric generation
9	Cepel	research and development (R&D)
10	Eletrobras	corporate management and administration
11	Rondônia	distribution
12	Acre	distribution
13	Piauí	distribution

In companies with a large numbers of units, many in remote locations that are difficult to access, it was not possible to collect information from all of their units. It can be seen, this year, that there was an improvement in environmental management in terms of GHG emissions. As the practice of inventorying the different sources of GHG emissions spreads, it will be easier to fill in the gaps of the information mosaic of the Eletrobras companies.

Following are the results, by company, of the emissions estimates for Carbon Dioxide (CO₂), Methane (CH₄) and Nitrous Oxide (N₂O) by stationary and mobile sources of the Eletrobras companies, as well as exhaust emissions of Sulfur Hexafluoride (SF₆) from electrical equipment and those proportional to the energy purchased from the national interconnected system (SIN), in "tons of CO₂ equivalent" (tCO₂e).

Emissions corresponding to transmission and distribution losses were not calculated per company, but for the whole system, for which reason they are not included in this chapter.

⁶ Eletrobras Furnas, Eletrobras Chesf and Eletrobras Eletronorte engage in generation (hydroelectric and thermoelectric) and transmission activities in a large number of units; the thermoelectric operations of Eletrobras Eletronuclear and Eletrobras CGTEE are on one single site, but they use different fuels; Eletrobras Eletrosul is more focused on transmission and is resuming its generation operations, with hydroelectric and wind units; Itaipu is one huge power generation plant; and Eletrobras Amazonas Energia operates in the realm of hydro and thermal generation in isolated systems and also with electricity distribution. Eletrobras engages in administrative and corporate management activities, while Eletrobras Cepel works in Research and Development.



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For emissions resulting from energy purchased for resale to non-end users – Electricity contracts (for example, power distribution), the GHG Protocol says that these may be reported under "optional information" ⁷. Thus, for purposes of transparency, these emissions are reported in this inventory, but not in the final sum total.

The estimate for air travel emissions was mentioned in some companies when it was possible to obtain a reliable result, but it is not included in the final result for the Eletrobras companies.

⁷ For more information about these indirect emissions, see Annex II of the Brazil GHG Protocol Program, p. 64.

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2.1 CGTEE

Eletrobras CGTEE holds the rights to exploit and produce electricity through its thermoelectric power plants set up in the state of Rio Grande do Sul. These include the: President Medici Thermoelectric Power Plant (Candiota II) - 446 MW; São Jerônimo Thermoelectric Power Plant - 20 MW; and Porto Alegre New Thermoelectric Power Plant- Nutepa - 24 MW.

The predominant primary source for generating electricity in Eletrobras CGTEE is mineral coal. However, diesel oil and fuel oil are also used on a smaller scale.

Eletrobras CGTEE 2010 - Results by scope and type of gas

GHG		CO₂ (tCO ₂)	CH₄ (tCO ₂ e)	N₂O (tCO ₂ e)	SF₆ (tCO ₂ e)	SUBTOTAL (tCO ₂ e)
Scope 1	Own Thermoelectric Power Plants	1,333,794.50	417.83	6,227.04	N/A	1,340,439.37
	Other Stationary Sources	N/av	N/av	N/av	N/A	N/av
	Mobile	288.55	0.55	5.76	N/A	294.86
	Fugitive SF6	N/A	N/A	N/A	N/A	N/A
	Fugitive - Extinguishers	1.12	N/A	N/A	N/A	1.12
	Subtotal Scope 1	1,334,084.17	418.37	6,232.81	N/A	1,340,735.35
Scope 2	Electricity Consumption	64.23	N/A	N/A	N/A	64.23
	Transmission Losses	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 2	64.23	0.00	0.00	0.00	64.23
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	N/A	N/A	N/A	N/A	N/A
TOTAL		1,334,148.40	418.37	6,232.81	0.00	1,340,799.59

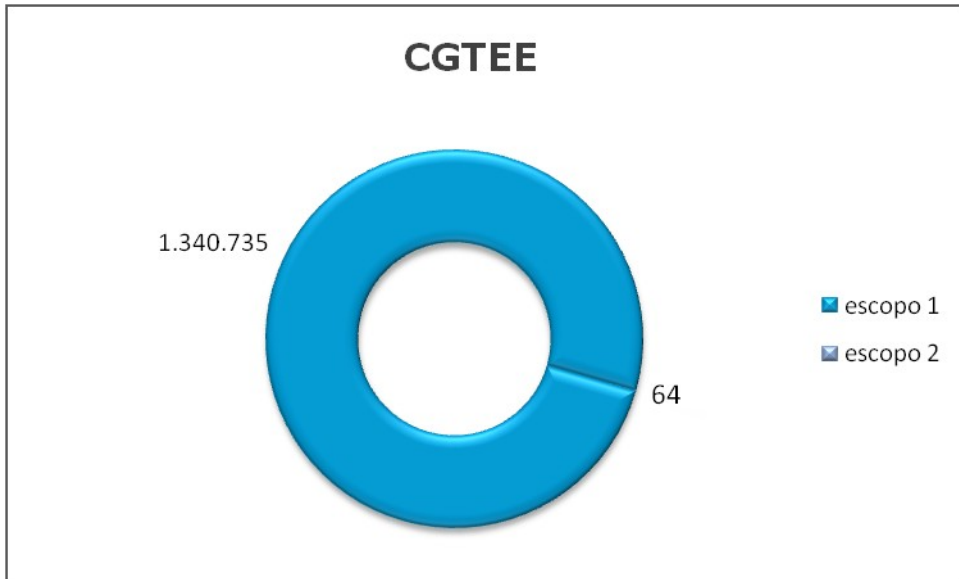
N/A = not applicable; N/av = not available data

Eletrobras CGTEE emissions in 2010 were slightly lower compared to the year before, due to a decrease in total generation starting from 2007, an occurrence associated with the increased unavailability of generating units and, consequently, a reduction in fuel consumption.

The reduction in total power generation by the Eletrobras CGTEE units made it impossible to meet contracted energy demand, and it was therefore necessary to purchase this amount of energy in the domestic market in order to honor the contracts and restore sales stability.

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For base year 2010, Eletrobras CGTEE emitted 195 tCO₂e due to energy purchases for fulfilling contracts. In addition, the estimate for air travel emissions during this period was 124 tCO₂e.



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2.2 Eletrobras Chesf

Eletrobras Chesf, which has a generating capacity of nearly 10,000 MW, mostly by water sources, has one plant, the Camaçari Thermoelectric Power Plant in Bahia, with 350 MW of installed power, which operates on natural gas and diesel oil. Its operation is subject to the dispatch of the National Interconnected System.

Eletrobras Chesf 2010 - Results by scope and type of gas

GHG		CO₂ (tCO₂)	CH₄ (tCO₂)	N₂O (tCO₂e)	SF₆ (tCO₂e)	SUBTOTAL (tCO₂e)
Scope 1	Own Thermoelectric Power Plants	4,623.60	6.15	14.66	N/A	4,644.42
	Other Stationary Sources	54.11	0.06	0.13	N/A	54.29
	Mobile	4,060.89	13.32	62.95	N/A	4,137.16
	Fugitive SF6	N/A	N/A	N/A	16,974.60	16,974.60
	Fugitive - Extinguishers	17.98	N/A	N/A	N/A	17.98
	Subtotal Scope 1	8,756.57	19.53	77.75	16,974.60	25,828.45
Scope 2	Electricity Consumption	255.98	N/A	N/A	N/A	255.98
	Transmission Losses	a.g.	a.g.	a.g.	N/A	N/A
	Subtotal Scope 2	255.98	0.00	0.00	0.00	255.98
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	N/A	N/A	N/A	N/A	N/A
SUBTOTAL		9,012.56	19.53	77.75	16,974.60	26,084.43

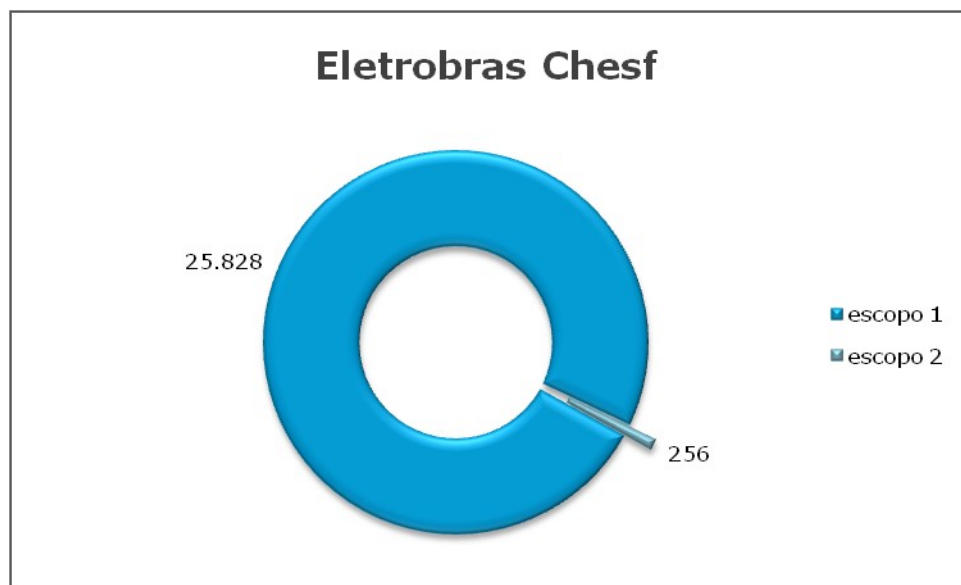
N/A = not applicable; N/av = not available data; a.g. = amount reported only for the group of companies

With regards to fugitive emissions associated with SF₆, Eletrobras Chesf, in compliance with Official Circular No. 0805/2009-SFG-SFE/ANEEL, of 08/27/2009, has been contributing to the elaboration of the Brazilian Inventory of Anthropogenic Emissions and Removals of Greenhouse Gases – SF₆ Emissions in Electrical Systems, coordinated by the Ministry of Science and Technology (MCT). This contribution is made through the inventory of all equipment containing SF₆, with the content and number of units at the end of each year since 1990, as well as by the information flow and yearly stocks. The emissions associated with this gas have decreased considerably. In 2009, they were in the neighborhood of 49,000 tCO₂e, whereas in 2010 emissions were approximately 17,000 tCO₂e.

Inventory of Greenhouse Gas Emissions – base year 2010

Total GHG emissions from Eletrobras Chesf for base year 2010 (26,084 tCO₂e) dropped in relation to base year 2009 (65,268 tCO₂e), mainly due to reduced emissions from stationary sources, in that the Camaçari Thermoelectric Power Plant dispatched little in 2010, as well as reduced fugitive SF₆ emissions. With respect to SF₆, for 2010, the equipment that uses this gas underwent a maintenance service required by ANEEL, which also contributed to reducing emissions.

For base year 2010, estimated air travel emissions for Eletrobras Chesf were 1,231 tCO₂e.



2.3 Eletrobras Furnas

Eletrobras Furnas has a system of 15 hydroelectric power plants, two thermoelectric power plants, more than 20,000 kilometers of transmission lines and 52 substations. The Eletrobras Furnas thermoelectric base consists of two plants, the Santa Cruz Thermoelectric Power Plant (766 MW) and the Campos Thermoelectric Power Plant (30 MW), both located in the state of Rio de Janeiro, and subject to the dispatch of the National Interconnected System.

In 2008, FURNAS was the first company of the Eletrobras System to join the Brazil GHG Protocol Program. This initiative greatly enhanced the value of the work of the GT 3, in regards to multiplying knowledge of the procedures that need to be adopted by the companies for collecting their data.

Eletrobras Furnas 2010 - Results by scope and type of gas

GHG		CO ₂ (tCO ₂)	CH ₄ (tCO ₂)	N ₂ O (tCO ₂ e)	SF ₆ (tCO ₂ e)	SUBTOTAL (tCO ₂ e)
Scope 1	Own Thermoelectric Power Plants	2,538.03	0.10	0.02	N/A	2,538.15
	Other Stationary Sources	N/av	N/av	N/av	N/A	N/av
	Mobile	5,407.04	0.53	0.32		5,407.89
	Fugitive SF ₆	N/A	N/A	N/A	93,457.20	93,457.20
	Fugitive - Extinguishers	N/av	N/av	N/av	N/A	N/av
	Subtotal Scope 1	7,945.08	0.62	0.34	93,457.20	101,403.24
Scope 2	Electricity Consumption	3,991.60	N/A	N/A	N/A	3,991.60
	Transmission Losses	a.g.	a.g.	a.g.	N/A	a.g.
	Subtotal Scope 2	3,991.60	0.00	0.00	0.00	3,991.60
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	N/A	N/A	N/A	N/A	N/A
SUBTOTAL		11,936.68	0.62	0.34	93,457.20	105,394.84

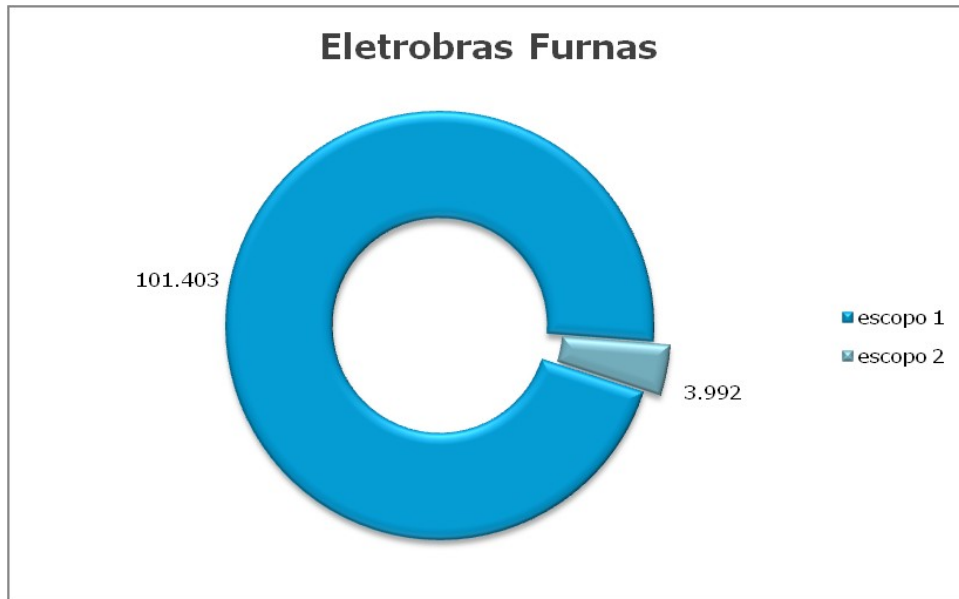
N/A = not applicable; N/av = not available data; a.g. = amount reported only for the group of companies

After three cycles of preparing inventories, the following relevant facts can be noted: a) the large share of Sulfur Hexafluoride (SF₆) in the company's breakdown of GHG emissions which, despite the decrease in base year 2010, is still the largest source of emissions; b) in 2010, as in 2009, SF₆ emissions surpassed those of stationary sources, mainly due to the fact that the Santa Cruz and Campos Thermoelectric Plants had not been dispatched.

To improve the quality of its inventory, the company has been working on measures such as: a) the exploration of technologies for detecting SF₆ leaks in electrical equipment; b) training of employees responsible for the desired

Inventory of Greenhouse Gas Emissions – base year 2010

information; c) aiming to obtain data on the charges of refrigerant gases, verification of procurement procedures for related services; and d) institutionalization, by means of a resolution by the board, of the annual preparation of the Inventory of Greenhouse Gas Emissions.



Inventory of Greenhouse Gas Emissions – base year 2010
2.4 Eletrobras Eletronorte

Of the approximately 25 million inhabitants living in the Amazon Region, more than 15 million benefit from electricity generated by Eletrobras Eletronorte in their hydroelectric power plants: Tucuruí (Pará), the largest truly Brazilian power plant and fourth largest in the world, Coaracy Nunes (Amapá), Samuel (Rondônia) and Curuá-Una (Pará) – and in its thermoelectric bases. The total installed power of the company's enterprises is 9,294.33 MW and its transmission systems have over 9,888.02 km of lines.

The Eletrobras Eletronorte thermoelectric base is divided into three systems: Acre, Rondônia and Amapá. The Acre and Rondônia systems were connected to the SIN in 2009, and, in 2010, the thermoelectric power plants of these systems were not dispatched.

In Rondônia and Amapá, there is also hydroelectric generation (Samuel and Coaracy Nunes Hydroelectric Power Plants). However, in these markets, the thermoelectric plants also operate in the base, resulting in the greenhouse gas emissions from stationary sources presented here.

Therefore, Eletrobras Eletronorte operates thermoelectric power plants in the states of Amapá, Acre, Rondônia and Roraima, and in the last three, the thermoelectric plants functioned in 2010 as "hot reserves", in other words, for guaranteeing the power output of the System.

Eletrobras Eletronorte 2010 - Results by scope and type of gas

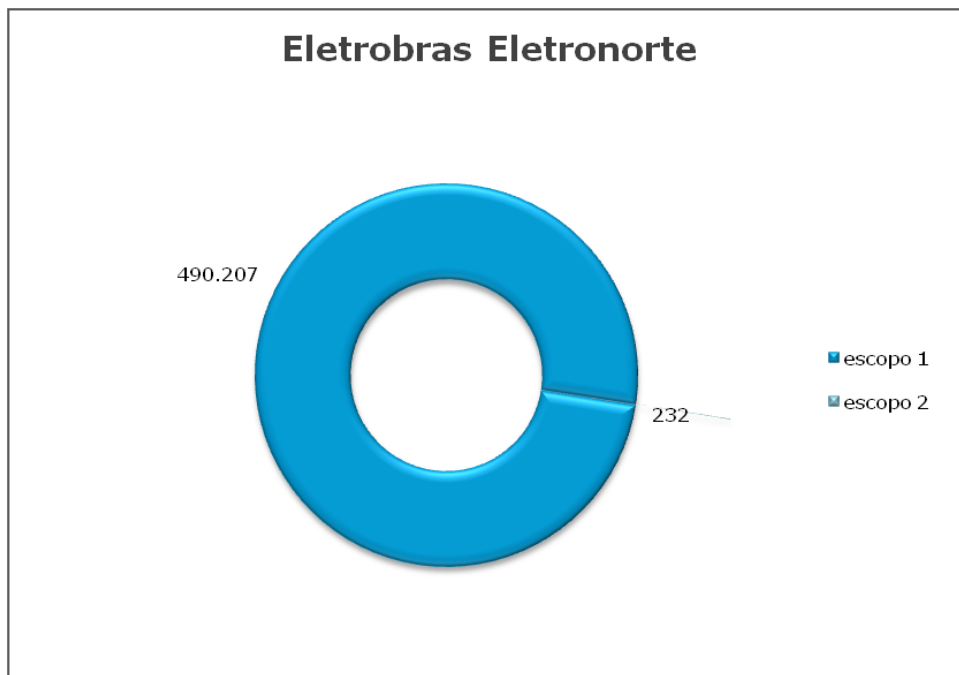
GHG		CO ₂ (tCO ₂)	CH ₄ (tCO ₂ e)	N ₂ O (tCO ₂ e)	SF ₆ (tCO ₂ e)	SUBTOTAL (tCO ₂ e)
Scope 1	Own Thermoelectric Power Plants	466,584.64	477.00	1,137.17	N/A	468,198.81
	Other Stationary Sources	6.69	0.00	0.00	N/A	6.69
	Mobile	82.35	0.19	1.91	N/A	84.45
	Fugitive SF ₆	N/A	N/A	N/A	21,910.80	21,910.80
	Fugitive - Extinguishers	6.02	N/A	N/A	N/A	6.02
	Subtotal Scope 1	466,679.69	477.19	1,139.08	21,910.80	490,206.77
Scope 2	Electricity Consumption	232.34	N/A	N/A	N/A	232.34
	Transmission Losses	a.g.	a.g.	a.g.	N/A	a.g.
	Subtotal Scope 2	232.34	0.00	0.00	0.00	232.34
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	N/A	N/A	N/A	N/A	N/A
SUBTOTAL		466,912.03	477.19	1,139.08	21,910.80	490,439.11

N/A = not applicable; N/av = not available data; a.g. = amount reported only for the group of companies

Inventory of Greenhouse Gas Emissions – base year 2010

Total emissions for Eletrobras Eletronorte in base year 2010 (490,439 tCO₂e) were much lower than base year 2009 (1,667,671 tCO₂e). This is mainly due to removing IPPs from the calculation of emissions from the thermoelectric power plants themselves, as recommended in GHG Protocol methodology. The emissions registered in 2009 from IPPs, within Scope 1 of Eletrobras Eletronorte are being reported, in this inventory, within Scope 3 of Eletrobras Distribuidora Rondônia. Furthermore, the connection of the Acre and Rondônia systems to the SIN also contributed to this reduction in emissions from Eletrobras Eletronorte in 2010.

For base year 2010, Eletrobras Eletronorte emitted 24 tCO₂e due to energy purchases for fulfilling contracts.



Inventory of Greenhouse Gas Emissions – base year 2010
2.5 Eletrobras Eletronuclear

Eletrobras Eletronuclear is the Eletrobras subsidiary responsible for the operation of the thermonuclear power plants and generates approximately 3% of the electricity consumed in Brazil. This power reaches the country's main consumption centers and accounts for more than 50% of the electricity consumed in the state of Rio de Janeiro, a proportion that will increase considerably with the completion of the third plant (Angra 3) of the Central Nuclear Almirante Álvaro Alberto – CNAEA.

The plants currently in operation are Angra 1, with 657 MW generation capacity, and Angra 2, with 1,350 MW, whose heat source comes from the nuclear fission that take place in its reactors. Angra 3, which is practically a replica of Angra 2 (incorporating technological advances that have occurred since the construction of the latter), is expected to generate 1,405 MW.

Eletrobras Eletronuclear 2010 - Results by scope and type of gas

GHG		CO ₂ (tCO ₂)	CH ₄ (tCO ₂)	N ₂ O (tCO ₂ e)	SF ₆ (tCO ₂ e)	SUBTOTAL (tCO ₂ e)
Scope 1	Own Thermoelectric Power Plants	N/A	N/A	N/A	N/A	N/A
	Other Stationary Sources	2.77	0.00	0.01	N/A	2.78
	Mobile	1,073.34	1.97	21.02	N/A	1,096.33
	Fugitive SF6	N/A	N/A	N/A	N/A	N/A
	Fugitive - Extinguishers	23.46	N/A	N/A	N/A	23.46
	Subtotal Scope 1	1,099.57	1.97	21.02	N/A	1,122.57
Scope 2	Electricity Consumption	6,782.97	N/A	N/A	N/A	6,782.97
	Transmission Losses	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 2	6,782.97	0.00	0.00	N/A	6,782.97
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	N/A	N/A	N/A	N/A	N/A
SUBTOTAL		7,882.54	1.97	21.02	0.00	7,905.53

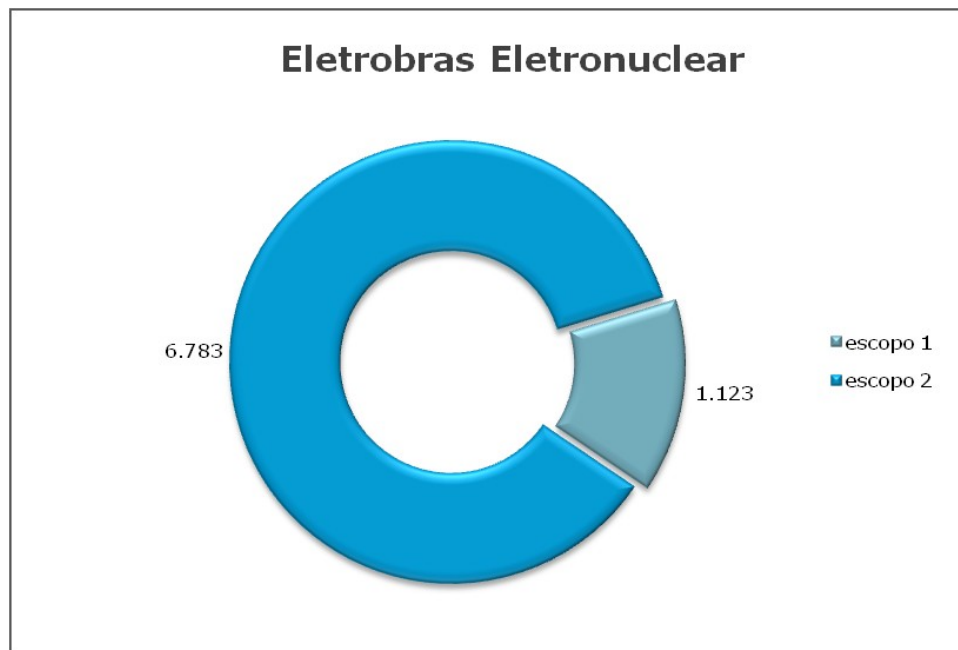
N/A = not applicable; N/av = not available data; a.g. = amount reported only for the group of companies

As far as direct emissions (Scope 1A - Stationary Sources), this nuclear fission process for generating power does not cause GHG emissions. However, fuel (diesel oil) is burned in both plants, used in the auxiliary boilers and emergency diesel generators. Since diesel oil consumption occurs on a very small scale, the amount of GHG emissions are much smaller than those found in the other Eletrobras companies.

Inventory of Greenhouse Gas Emissions – base year 2010

Regarding electricity consumption, Scope 2 – Indirect Emissions, the Angra nuclear power plants, for the most part, use their own generation. Besides administrative consumption, the electricity that comes from the system is used in the nuclear power plants to complement their operational needs and supply consumption during the shutdowns that take place for maintenance and fuel replenishment in the plants.

Total emissions for Eletrobras Eletronuclear in base year 2010 (7,905 tCO₂e) were slightly higher than base year 2009 (6,067 tCO₂e). This is mainly due to increased emissions resulting from electricity consumption.



2.6 Eletrobras Eletrosul

Eletrobras Eletrosul transmits and generates electricity for the states in the South Region, Mato Grosso, Mato Grosso do Sul and more recently in Rondônia – serving more than 30 million people. The Eletrobras Eletrosul transmission system, with a total transformation capacity of 22,660.3 MVA, is interconnected with the transmission system of Brazil's Southeast Region. Energy integration between Brazil and Argentina occurs through the Uruguiana frequency converter substation and integration between Brazil and Uruguay occurs through the Livramento – Rivera transmission line.

The company has different projects in the implementation phase, in particular the following hydroelectric power plants – Passo São João (77 MW, in Rio Grande do Sul), São Domingos (48 MW, in Mato Grosso do Sul) and Jirau (3,300 MW, in Rondônia), the latter also with the Suez Energy, Camargo Correa Investimentos and Eletrobras Chesf companies. The Cerro Chato Wind Farms I, II and III (90 MW), in Rio Grande do Sul, on the border between Brazil and Uruguay, recently went into operation.

Eletrobras Eletrosul 2010 - Results by scope and type of gas

GHG		CO ₂ (tCO ₂)	CH ₄ (tCO ₂)	N ₂ O (tCO ₂ e)	SF ₆ (tCO ₂ e)	SUBTOTAL (tCO ₂ e)
Scope 1	Own Thermoelectric Power Plants	N/A	N/A	N/A	N/A	N/A
	Other Stationary Sources	99.69	0.09	0.22	N/A	100.01
	Mobile	1,623.63	3.59	29.84	N/A	1,657.06
	Fugitive SF6	N/A	N/A	N/A	8,704.36	8,704.36
	Fugitive - Extinguishers	2.87	N/A	N/A	N/A	2.87
	Subtotal Scope 1	1,726.19	3.69	30.06	8,704.36	10,464.29
Scope 2	Electricity Consumption	883.24	N/A	N/A	N/A	883.24
	Transmission Losses	a.g.	a.g.	a.g.	a.g.	a.g.
	Subtotal Scope 2	883.24	0.00	0.00	0.00	883.24
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	N/A	N/A	N/A	N/A	N/A
SUBTOTAL		2,609.43	3.69	30.06	8,704.36	11,347.53

N/A = not applicable; N/av = not available data; a.g. = amount reported only for the group of companies

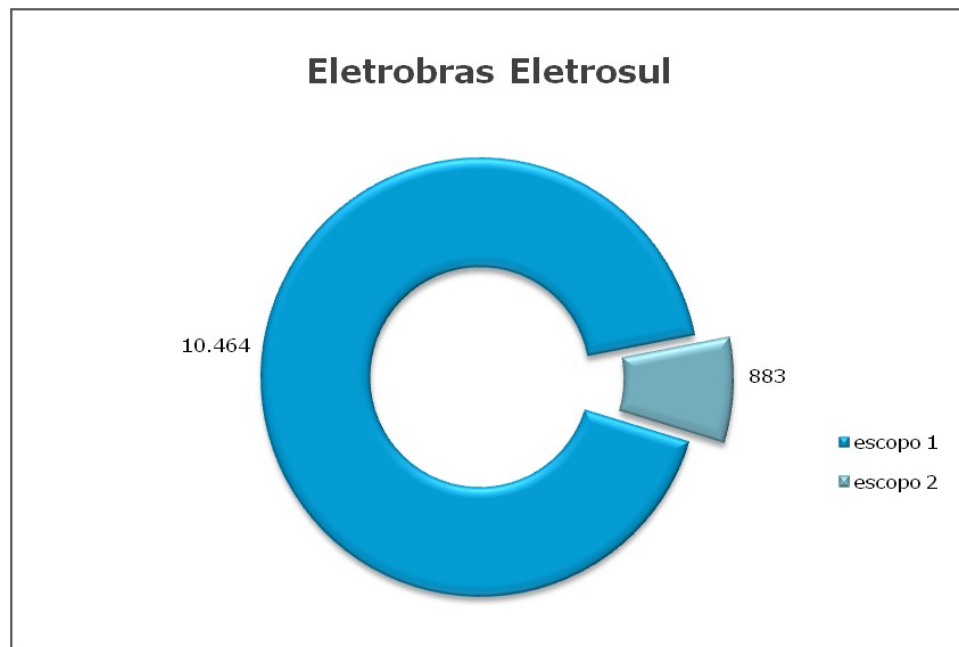
The data in regard to fugitive SF₆ emissions was obtained from the database of the System Maintenance Department. Of their own 41 substations, 40 have equipment insulated with SF₆ gas or mineral oil. The exception is the Alegrete

Inventory of Greenhouse Gas Emissions – base year 2010

Substation, located in Rio Grande do Sul, which uses compressed air or mineral oil as an electrical insulator.

There was a small increase in total emissions from Eletrobras Eletrosul, for base year 2010, in comparison to emissions from base year 2009 (8,700 tCO₂e), which occurred due to increased emissions from stationary sources and fugitive emissions.

For base year 2010, Eletrobras Eletrosul emitted 16,765 tCO₂e, due to energy purchases for fulfilling contracts. In turn, the emissions estimate for air travel was 707 tCO₂e.



2.7 Eletrobras Amazonas Energia

The state of Amazonas, in spite of its huge hydro potential, has always been lacking in electricity supply. Among different reasons, one is the long distance from consumer centers, making it necessary to use thermoelectric plants.

Eletrobras Amazonas Energia is responsible for the generation, transmission, distribution and sale of all the energy for the state of Amazonas, serving approximately 680,000 consumers, and is divided into two distinct systems: The Manaus System with the markets of Manaus, Iranduba, Presidente Figueiredo and Rio Preto da Eva, and the Interior System, with the remaining locations.

Eletrobras Amazonas Energia 2010 - Results by scope and type of gas

GHG		CO ₂ (tCO ₂)	CH ₄ (tCO ₂)	N ₂ O (tCO ₂ e)	SF ₆ (tCO ₂ e)	SUBTOTAL (tCO ₂ e)
Scope 1	Own Thermoelectric Power Plants	3,057,153.07	3,063.89	7,304.31	N/A	3,067,521.26
	Other Stationary Sources	N/av	N/av	N/av	N/A	N/av
	Mobile	53.35	0.18	1.30	N/A	54.83
	Fugitive SF ₆	N/A	N/A	N/A	2,280.00	2,280.00
	Fugitive - Extinguishers	3.90	N/A	N/A	N/A	3.90
	Subtotal Scope 1	3,057,210.32	3,064.07	7,305.61	2,280.00	3,069,859.99
Scope 2	Electricity Consumption	3,517.50	N/A	N/A	N/A	3,517.50
	Transmission Losses	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 2	3,517.50	0.00	0.00	0.00	3,517.50
Scope 3	IPP	1,562,511.90	1,530.46	3,648.61	N/A	1,567,690.97
	Subtotal Scope 3	1,562,511.90	1,530.46	3,648.61	N/A	1,567,690.97
SUBTOTAL		4,623,239.72	4,594.53	10,954.22	2,280.00	4,641,068.47

N/A = not applicable; N/av = not available data; a.g. = amount reported only for the group of companies

The Manaus System, made up of a complex of different electricity generation sources (Thermoelectric Plants, Balbina Hydroelectric Power Plant and IPPs), serves 442,555 active consumers (data from December/2009), of which 399,479 are residential. Its actual power is pegged at 1,081 MW. The goal of the Interior System is to attend to the other municipalities, covering an area of 1.57 million square kilometers. It comprises 105 locations (61 municipal seats and 44 localities), serving 236,903 consumers, of which 188,517 are residential. The actual power of its generation complex is 314 MW. The results

Inventory of Greenhouse Gas Emissions – base year 2010

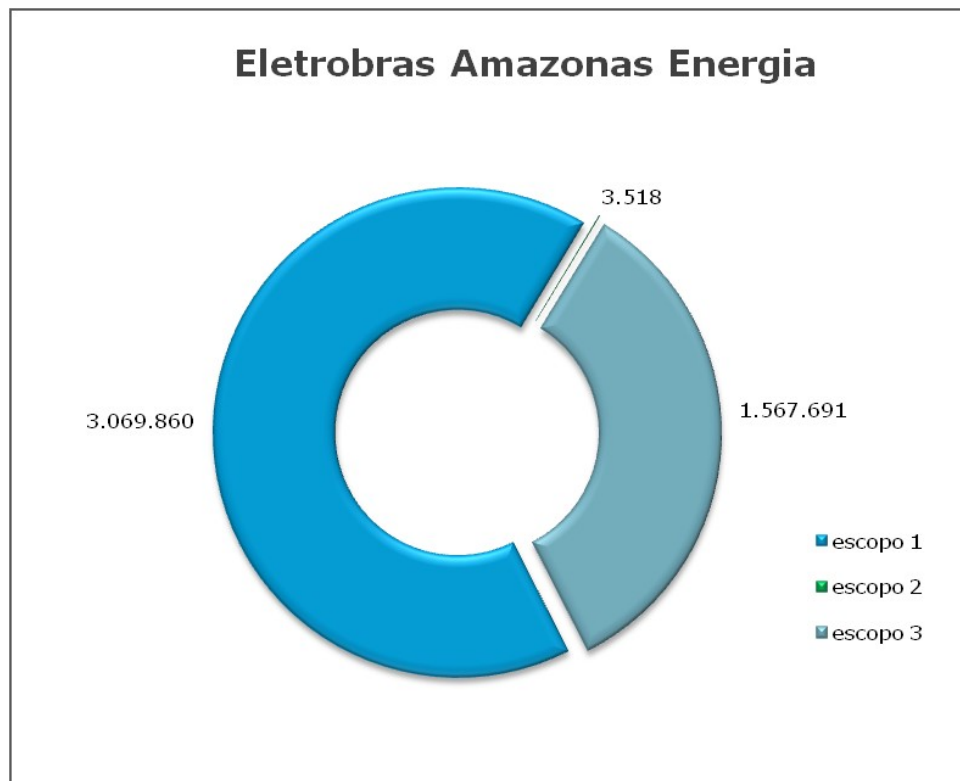
presented below correspond to the sum of emissions and amounts of energy generated by the two complexes.

The emissions taken into account in the Manaus System were those from the Aparecida, Electron and Mauá plants that use fuel oil, and the Cidade Nova, Flores and São José Thermolectric Power Plants, which use diesel oil for electricity generation. The Interior System is composed of more than 100 plants, all working on diesel oil.

The GHG emissions during this period are directly related to meeting the demand of these systems, which is predominantly thermal.

The Amazonas electric power market is the only one in the country that is totally non-interconnected. The interconnection of the Manaus System with the National Interconnected System (SIN) will occur via the Tucuruí – Manaus Transmission Line, scheduled to go into operation in June 2013. Thus, the tendency is that greenhouse gas emissions will decrease. However, a transition and adaptation period needs to be taken into account that cannot yet be determined at present.

For base year 2010, estimated air travel emissions for Eletrobras Amazonas Energia were 128 tCO₂e.



Inventory of Greenhouse Gas Emissions – base year 2010
2.8 Itaipu Binacional

Located along the Paraná River, between Foz do Iguacu (Brazil) and Ciudad del Este (Paraguay), Itaipu Binacional has 14,000 MW of installed power in a single power plant, with 20 generating units of 700 MW each, which supplies 18.9% of the energy consumed in Brazil and 77% in Paraguay.

Since 2006, Itaipu Binacional (the Brazilian half) has prepared annual Sustainability Reports, seeking to fine-tune already included items and improve the quantification of variables, among which the GHG emissions related to the Company's production process.

Itaipu Binacional 2010 - Results by scope and type of gas

GHG		CO₂ (tCO₂)	CH₄ (tCO₂e)	N₂O (tCO₂e)	SF₆ (tCO₂e)	SUBTOTAL (tCO₂e)
Scope 1	Own Thermoelectric Power Plants	N/A	N/A	N/A	N/A	N/A
	Other Stationary Sources	28.23	0.02	0.04	N/A	28.30
	Mobile	1,606.41	5.44	25.68	N/A	1,637.53
	Fugitive SF ₆	N/A	N/A	N/A	7,410.00	7,410.00
	Fugitive - Extinguishers	2.10	N/A	N/A	N/A	2.10
	Subtotal Scope 1	1,636.74	5.46	25.72	7,410.00	9,077.93
Scope 2	Electricity Consumption	114.09	N/A	N/A	N/A	114.09
	Transmission Losses	a.g.	a.g.	a.g.	a.g.	a.g.
	Subtotal Scope 2	114.09	0.00	0.00	0.00	114.09
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	N/A	N/A	N/A	N/A	N/A
SUBTOTAL		1,750.83	5.46	25.72	7,410.00	9,192.01

N/A = not applicable; N/av = not available data; a.g. = amount reported only for the group of companies

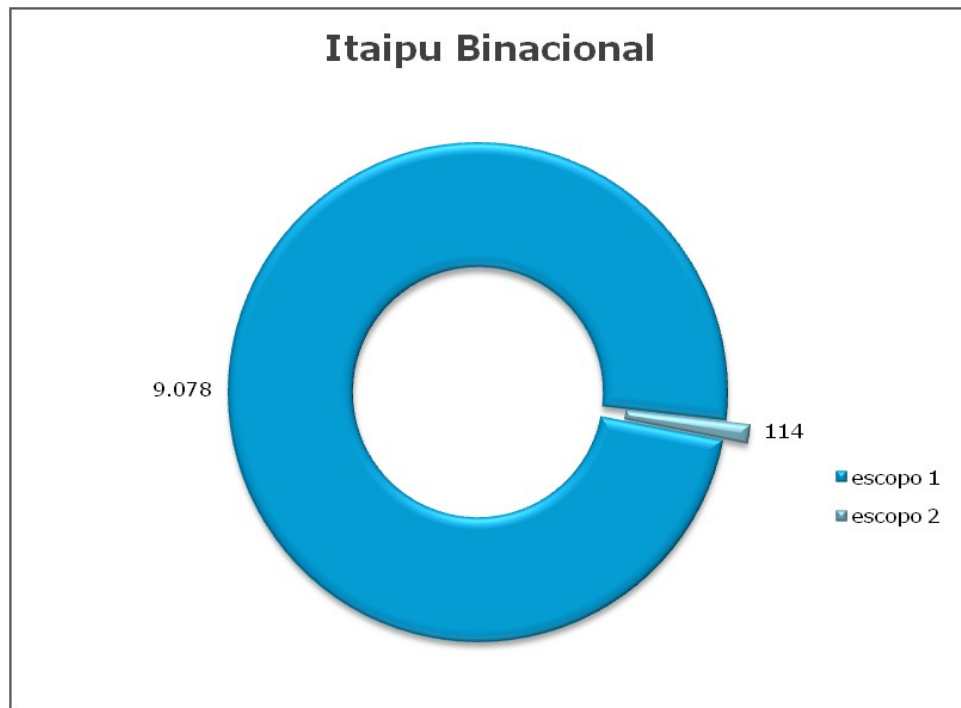
Itaipu Binacional has been implementing measures in an effort to reduce their GHG emissions. In its own fleet, it gives preference to Flex Power vehicles. Thus, in 2010, its own transportation consumed 293,000 liters of ethanol, which avoided the emission of hundreds of thousands of tons of CO₂ had the vehicles used gasoline. In addition, the company began to monitor and register fugitive SF₆ emissions.

Total emissions for Itaipu in base year 2010 (9,192 tCO₂e) were much lower than base year 2009 (16,307 tCO₂ee). This is due mainly to reduced fugitive SF₆ emissions, which went from 14,340 tCO₂e, in 2009, to 7,410 tCO₂e, in 2010. It is worth noting that for the inventory base year 2009, fugitive SF₆

Inventory of Greenhouse Gas Emissions – base year 2010

emissions corresponding to all of Itaipu were registered, despite the fact that half of these emissions belonged to Paraguay. For this inventory, the Itaipu emissions were divided by both countries, reflecting a reduction of approximately fifty percent in the emissions of this gas.

For base year 2010, estimated air travel emissions for Itaipu were 1,362 tCO₂e.



Inventory of Greenhouse Gas Emissions – base year 2010
2.9 Eletrobras Cepel

The Electric Energy Research Center – Eletrobras Cepel has two laboratory units that are split between the headquarters (Electric Systems Laboratory) set up at the university campus of Ilha do Fundão, in Rio de Janeiro, and the Adrianópolis unit (Electrical Equipment Laboratory), in the city of Nova Iguaçu, also in Rio de Janeiro.

The purpose of its operations are limited to Research and Development (R&D), but there are some activities in the laboratories, offices and in regards to transportation and food for its employees that result in GHG emissions, such as electricity consumption, diesel fuel consumption in emergency generator groups, LPG consumption in chemical analysis laboratories and in restaurants; consumption of gasoline, ethanol, diesel and LPG in its own and outsourced fleet of transportation vehicles for its employees, including buses (routes), diesel and gasoline consumption used in forklifts, lawn mowers and other mobile equipment; and fugitive emissions: SF₆ balance of electrical equipment from the Adrianópolis unit substation.

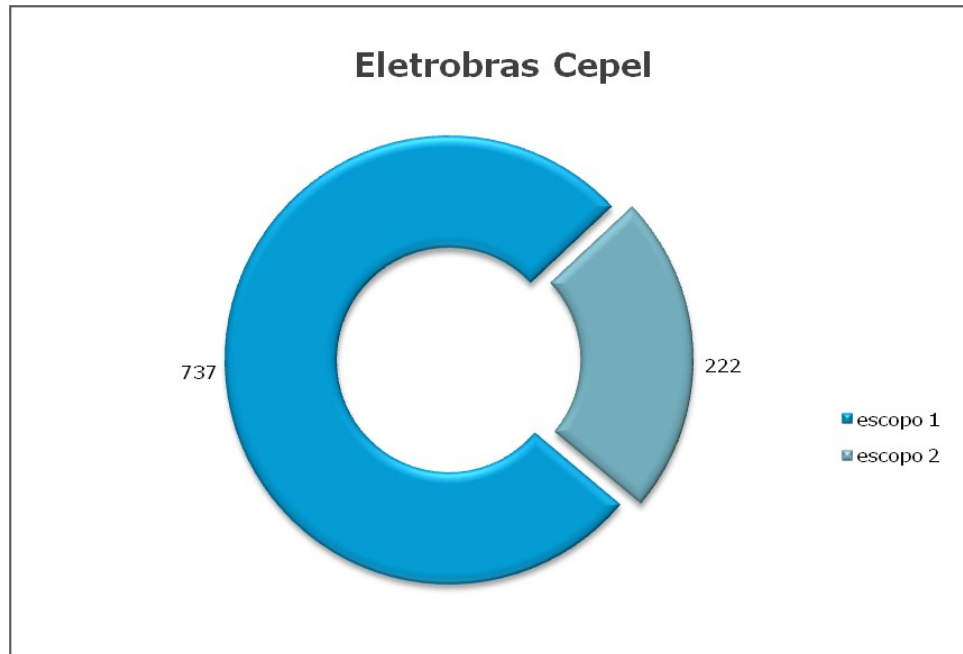
Eletrobras Cepel 2010 - Results by scope and type of gas

GHG		CO₂ (tCO₂)	CH₄ (tCO₂)	N₂O (tCO₂e)	SF₆ (tCO₂e)	SUBTOTAL (tCO₂e)
Scope 1	Own Thermolectric Power Plants	N/A	N/A	N/A	N/A	N/A
	Other Stationary Sources	56.67	0.03	0.05	N/A	56.75
	Mobile	622.56	1.04	9.76	N/A	633.36
	Fugitive SF ₆	N/A	N/A	N/A	45.60	45.60
	Fugitive - Extinguishers	1.53	N/A	N/A	N/A	1.53
	Subtotal Scope 1	680.76	1.07	9.82	45.60	737.25
Scope 2	Electricity Consumption	221.66	N/A	N/A	N/A	221.66
	Transmission Losses	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 2	221.66	0.00	0.00	0.00	221.66
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	N/A	N/A	N/A	N/A	N/A
SUBTOTAL		902.42	1.07	9.82	45.60	958.90

N/A = not applicable; N/av = not available data

Total emissions from Eletrobras Cepel decreased between the base year 2009 inventory (1,073 tCO₂e) and this inventory (958 tCO₂e). This occurred due to reduced emissions from stationary sources and SF₆ gas.

Inventory of Greenhouse Gas Emissions – base year 2010



Inventory of Greenhouse Gas Emissions – base year 2010
2.10 Eletrobras

Eletrobras (holding company) engages in management and administration functions for the Eletrobras companies, with units in Brasilia (two floors of a commercial building) and in Rio de Janeiro, where it occupies different floors in four different commercial buildings in the city's downtown area.

In this edition of the inventory, its emissions can be summed up as those coming from its own vehicle fleet (Scope 1B), fugitive emissions from fire extinguishers and the consumption of energy purchased from local distributors (Scope 2).

Eletrobras 2010 - Results by scope and type of gas

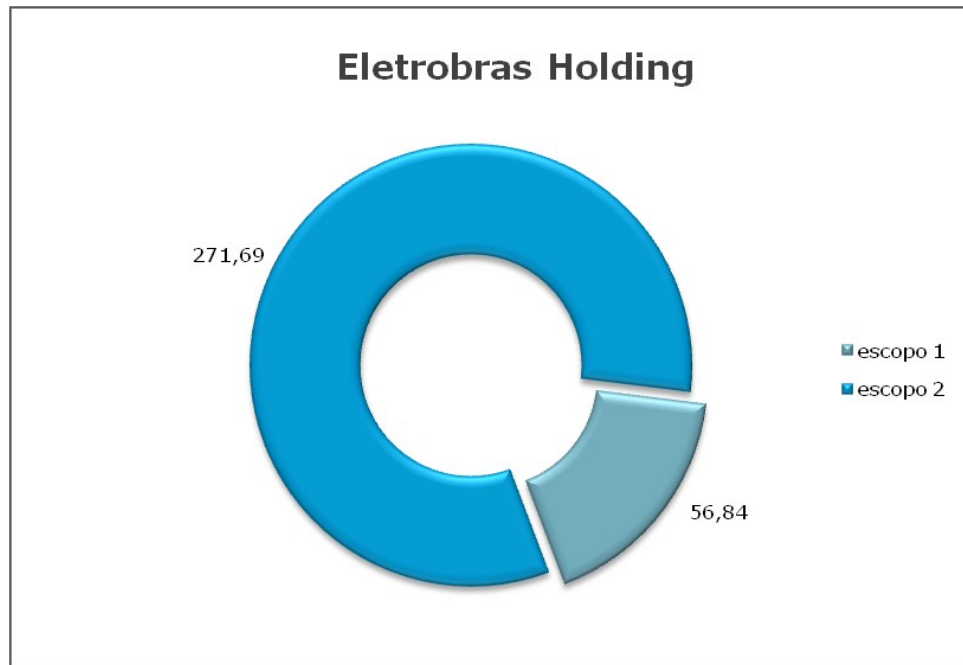
GHG		CO₂ (tCO₂)	CH₄ (tCO₂)	N₂O (tCO₂e)	SF₆ (tCO₂e)	SUBTOTAL (tCO₂e)
Scope 1	Own Thermoelectric Power Plants	N/A	N/A	N/A	N/A	N/A
	Other Stationary Sources	N/A	N/A	N/A	N/A	N/A
	Mobile	53.35	0.53	1.82	N/A	55.69
	Fugitive SF ₆	N/A	N/A	N/A	N/A	N/A
	Fugitive - Extinguishers	1.15	N/A	N/A	N/A	1.15
	Subtotal Scope 1	54.50	0.53	1.82	0.00	56.84
Scope 2	Electricity Consumption	271.69	N/A	N/A	N/A	271.69
	Transmission Losses	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 2	271.69	0.00	0.00	0.00	271.69
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	N/A	N/A	N/A	N/A	N/A
SUBTOTAL		326.19	0.53	1.82	0.00	328.54

N/A = not applicable; N/av = not available data

Total emissions for Eletrobras were a little higher in this inventory (328 tCO₂e) in comparison to the 2009 base year inventory (186 tCO₂e). This is mainly due to the increased data that was obtained in the company's units.

For base year 2010, estimated air travel emissions for Eletrobras were 189 tCO₂e.

Inventory of Greenhouse Gas Emissions – base year 2010



2.11 Eletrobras Distribuição Rondônia

The purpose of the company is to provide public services in the realm of generation, transmission, distribution and sale of electricity, as well as engage in all commercial activities necessary for achieving these goals. It was set up on December 1, 1969, serving only two municipalities from Rondônia – Porto Velho, the capital of the state and Guajará-Mirim – through isolated nuclei of diesel-run thermal generation, with an installed power of 2,893 kW, supplying power around the clock for the two municipalities.

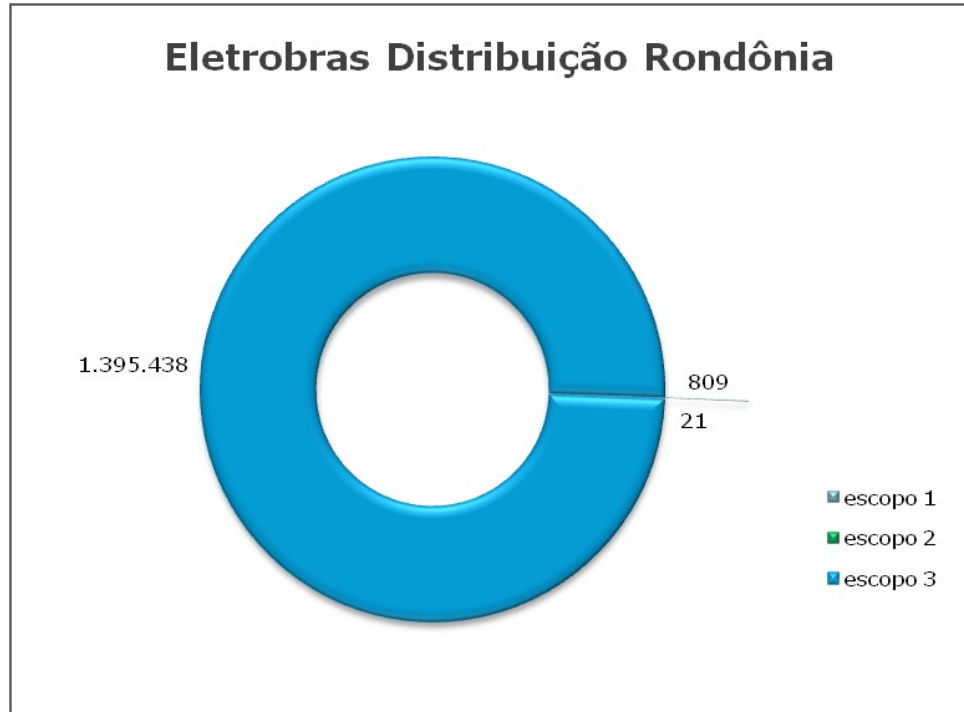
Eletrobras Distribuição Rondônia 2010 - Results by scope and type of gas

GHG		CO ₂ (tCO ₂)	CH ₄ (tCO ₂ e)	N ₂ O (tCO ₂ e)	SF ₆ (tCO ₂ e)	SUBTOTAL (tCO ₂ e)
Scope 1	Own Thermoelectric Power Plants	N/A	N/A	N/A	N/A	N/A
	Other Stationary Sources	N/av	N/av	N/av	N/A	N/av
	Mobile	657.20	1.10	11.85	N/A	670.15
	Fugitive SF ₆	N/A	N/A	N/A	136.80	136.80
	Fugitive – Extinguishers	1.62	N/A	N/A	N/A	1.62
	Subtotal Scope 1	658.83	1.10	11.85	136.80	808.57
Scope 2	Electricity Consumption	20.76	N/A	N/A	N/A	20.76
	Transmission Losses	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 2	20.76	0.00	0.00	0.00	20.76
Scope 3	IPP	1,390,626.65	1,421.67	3,389.26	N/A	1,395,437.59
	Subtotal Scope 3	1,390,626.65	1,421.67	3,389.26	N/A	1,395,437.59
SUBTOTAL		1,391,306.25	1,422.77	3,401.11	136.80	1,396,266.92

N/A = not applicable; N/av = not available data

Since this is the first year that Eletrobras Distribuição Rondônia is reporting its emissions, there is no former history to compare with. Nevertheless, it can be seen that IPPs are the main ones responsible for the emissions of this company, accounting for more than 99% of the emissions.

Inventory of Greenhouse Gas Emissions – base year 2010



Inventory of Greenhouse Gas Emissions – base year 2010
2.12 Eletrobras Distribuição Acre

Eletrobras Distribuição Acre is a federal public service utility responsible for the distribution and sale of electricity for the entire state of Acre. Shareholder control was previously exercised by the state government, and at present by Centrais Elétricas Brasileiras S.A. - Eletrobras, which holds 93.29% of its total capital.

It's worth noting that the supply of electricity to the whole state, is through diesel-run thermoelectric power plants (100%).

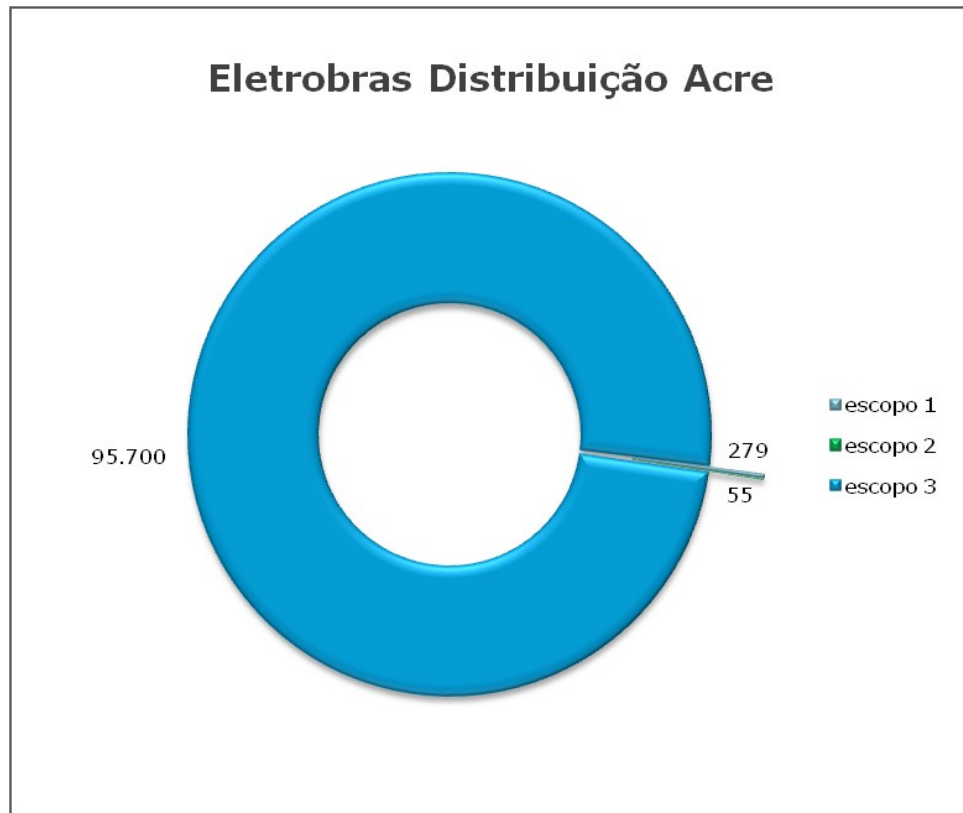
Eletrobras Distribuição Acre 2010 - Results by scope and type of gas

GHG		CO₂ (tCO₂)	CH₄ (tCO₂e)	N₂O (tCO₂e)	SF₆ (tCO₂e)	SUBTOTAL (tCO₂e)
Scope 1	Own Thermoelectric Power Plants	N/A	N/A	N/A	N/A	N/A
	Other Stationary Sources	3.79	0.00	0.01	N/A	3.80
	Mobile	269.34	0.45	4.91	N/A	274.70
	Fugitive SF ₆	N/A	N/A	N/A	N/av	N/av
	Fugitive - Extinguishers	0.21	N/A	N/A	N/A	0.21
	Subtotal Scope 1	273.34	0.45	4.92	N/A	278.71
Scope 2	Electricity Consumption	55.01	N/A	N/A	N/A	55.01
	Transmission Losses	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 2	55.01	0.00	0.00	0.00	55.01
Scope 3	IPP	95,369.95	97.50	232.44	N/A	95,699.89
	Subtotal Scope 3	95,369.95	97.50	232.44	N/A	95,699.89
SUBTOTAL		95,698.30	97.95	237.36	0.00	96,033.61

N/A = not applicable; N/av = not available data

The emissions from Eletrobras Distribuição Acre derive primarily from IPPs, which represent more than 99% of the company's emissions.

Inventory of Greenhouse Gas Emissions – base year 2010



Inventory of Greenhouse Gas Emissions – base year 2010

2.13 Eletrobras Distribuição Piauí

Eletrobras Distribuição Piauí is a power distribution company of Eletrobras whose concession area is the state of Piauí. It serves more than 892,000 customers, with an annual net revenue of US\$ 322.39 million.

Unlike other distribution companies, the emissions from Eletrobras Distribuição Piauí are mainly due to mobile sources and fugitive SF₆ emissions.

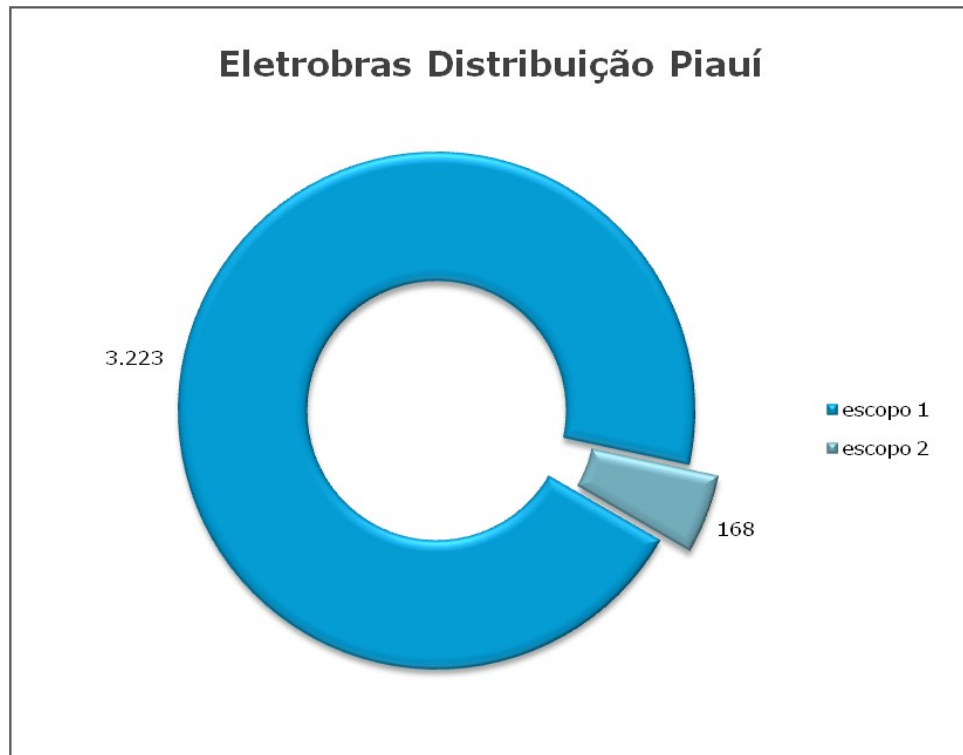
For base year 2010, estimated air travel emissions for Eletrobras Distribuidora Piauí were 310 tCO₂e.

Eletrobras Distribuição Piauí 2010 - Results by scope and type of gas

GHG		CO ₂ (tCO ₂)	CH ₄ (tCO ₂)	N ₂ O (tCO ₂ e)	SF ₆ (tCO ₂ e)	SUBTOTAL (tCO ₂ e)
Scope 1	Own Thermoelectric Power Plants	N/A	N/A	N/A	N/A	N/A
	Other Stationary Sources	4.90	0.01	0.01	N/A	4.91
	Mobile	1,813.53	2.85	31.58	N/A	1,847.96
	Fugitive SF ₆	N/A	N/A	N/A	1,368.0	1,368.00
	Fugitive - Extinguishers	2.57	N/A	N/A	N/A	2.57
	Subtotal Scope 1	1,820.99	2.86	31.60	1,368.00	3,223.44
Scope 2	Electricity Consumption	168.05	N/A	N/A	N/A	168.05
	Transmission Losses	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 2	168.05	0.00	0.00	0.00	168.05
Scope 3	IPP	N/A	N/A	N/A	N/A	N/A
	Subtotal Scope 3	0.00	0.00	0.00	0.00	
SUBTOTAL		1,989.03	2.86	31.60	1,368.00	3,391.49

N/A = not applicable; N/av = not available data

Inventory of Greenhouse Gas Emissions – base year 2010



Inventory of Greenhouse Gas Emissions – base year 2010
3. Consolidated result of the Eletrobras companies

The consolidated result of the Eletrobras companies, corresponding to the sum total of GHG emissions from thirteen of their companies, is equal to 8,666,945.79 tons of CO₂ equivalent (tCO₂e).

Of this total, the largest share of emissions comes from stationary sources (thermoelectric power plants), at 4,883,342 tCO₂e, which accounts for 56.34%. This is due to the thermoelectric generating base set up under the responsibility of the Eletrobras CGTEE, Eletronorte and Amazonas Energia companies.

Table 3.1
GHG Emissions of the Eletrobras Companies - base year 2010 (tCO₂e)

Eletrobras Companies	Scope 1 (tCO₂e)	Scope 2 (tCO₂e)	Scope 3 (tCO₂e)	SUBTOTAL (tCO₂e)	(%)
CGTEE	1,340,735.35	64.23	N/A	1,340,799.59	15.47
Chesf	25,828.45	255.98	N/A	26,084.43	0.30
Furnas	101,403.24	3,991.60	N/A	105,394.84	1.22
Eletronorte	490,206.77	232.34	N/A	490,439.11	5.66
Eletronuclear	1,122.57	6,782.97	N/A	7,905.53	0.09
Eletrosul	10,464.29	883.24	N/A	11,347.53	0.13
Amazonas Energia	3,069,859.99	3,517.50	1,567,690.97	4,641,068.47	53.55
Itaipu	9,077.93	114.09	N/A	9,192.01	0.11
Cepel	737.25	221.66	N/A	958.90	0.01
Eletrobras	56.84	271.69	N/A	328.54	0.00
Rondônia	808.57	20.76	1,395,437.59	1,396,266.92	16.11
Acre	278.71	55.01	95,699.89	96,033.61	1.11
Piauí	3,223.44	168.05	N/A	3,391.49	0.04
Transmission Losses		537,734.82		537,734.82	6.20
SUBTOTAL (tCO₂e)	5,053,803.40	554,313.94	3,058,828.45	TOTAL (tCO₂e) 8,666,945.79	
(%)	58.31	6.40	35.29		

1) N/A = not applicable; N/av = not available

Independent Power Producers (IPPs), which make up part of the indirect emissions (Scope 3) from the Amazonas Energia, Eletrobras Distribuidora Rondônia and Eletrobras Distribuidora Acre companies, totaled 3,058,828 tCO₂e (35.29% of total).

Inventory of Greenhouse Gas Emissions – base year 2010

Transmission losses generated a significant portion of GHG emissions, at approximately 540 tCO₂e, corresponding to 6.20% of total emissions.

Another important source is SF₆ exhaust (fugitive emissions – Scope 1), originating from the maintenance of electrical equipment that uses this gas, totaling 152,287 tCO₂e (1.76% of total emissions).

The other inventoried sources – vehicles (mobile sources), fugitive emissions from fire extinguishers, electricity purchased by the companies and electricity contracts together represent about 0.41% of the total.

Looking at the ratio in Table 3.2 between the amount of GHG emissions and energy generated (MWh), it can be seen that this ratio is very small, except for the companies that play a greater role in thermoelectric generation. In the group of Eletrobras companies, this ratio is extremely positive, indicating mostly clean energy production.

Table 3.2
Emission Intensity of the Eletrobras Companies
GHG Emissions by Net Generation (MWh) - base year 2010

Eletrobras Companies	Emissions	Total net generation	Emissions / total net generation
	(tCO ₂ e)	(MWh)	(tCO ₂ e / MWh)
CGTEE	1,340,799.59	612,516	2.1890
Chesf	26,084.43	44,162,411	0.0006
Furnas	105,394.84	38,352,300	0.0027
Eletronorte	490,439.11	40,323,160	0.0122
Eletronuclear	7,905.53	14,543,807	0.0005
Eletrósul	11,347.53	N/A	-
Amazonas Energia	4,641,068.47	5,704,259	0.8136
Itaipu	9,192.01	42,985,000	0.0002
Cepel	958.90	N/A	-
Eletrobras	328.54	N/A	-
Rondônia	1,396,266.92	N/A	-
Acre	96,033.61	N/A	-
Piauí	3,391.49	N/A	-
TOTAL*	8,666,945.79	186,620,693	0.0464

* The total amount of emissions due to transmission losses was added to this total.

Source of Total Net Generation in 2010 (MWh): Eletrobras Generation Engineering Department - EGG

In the historical series of emissions from Eletrobras companies, a gross increase can be noted from 2009 to 2010, which can be explained by the entry of three more companies and an increase in the scope of this Inventory.

Inventory of Greenhouse Gas Emissions – base year 2010
**Table 3.3
GHG Emissions of the Eletrobras Companies - 2003 to 2010**

							2009	2010	
	2003	2004	2005	2006	2007	2008			
CO ₂ (tCO ₂)	4,564,580	4,806,020	5,744,560	4,667,800	4,900,920	5,080,970	7,103,858	7,918,102	
CH ₄ (tCO ₂)	2,650	2,670	2,800	2,650	2,810	3,370	6,069	7,098	
N ₂ O (tCO ₂ e)	16,110	17,790	18,960	18,920	17,500	16,110	20,312	22,272	
SF ₆ (tCO ₂ e)	-	-	-	-	-	-	236,316	152,287	
Transmission Losses									567,186
TOTAL (tCO₂e)	4,583,340	4,826,470	5,766,330	4,689,370	4,921,240	5,100,450	7,366,545	8,666,946	

Note: Until 2008, only Stationary Sources were taken into account (Scope 1A of the GHG Protocol).

**Table 3.4
Annual GHG Emissions of the Eletrobras Companies (estimated in tCO₂e)**

Eletrobras Companies	2003	2004	2005	2006	2007	2008	2009	2010	
CGTEE	1,984,630	2,298,340	2,525,610	2,631,520	2,196,730	1,497,570	1,483,830	1,340,799.59	
Chesf	224,730	54,280	35,460	3,560	45,090	594,070	652,680	26,084.43	
Furnas	394,780	170,550	149,880	4,110	24,940	144,440	114,730	105,394.84	
Eletronorte	1,187,350	2,298,340	1,882,750	1,116,700	1,584,510	1,630,150	1,667,670	490,439.11	
Eletronuclear	2,610	1,484,250	2,280	3,190	3,140	2,650	6,070	7,905.53	
Eletrósul	N/A	N/A	N/A	N/A	N/A	N/A	8,690	11,347.53	
Amazonas Energia	789,230	816,730	1,170,350	930,300	1,066,830	1,231,560	4,002,700	4,641,068.47	
Itaipu	N/av	N/av	N/av	N/av	N/av	N/av	16,310	9,192.01	
Cepel	N/av	N/av	N/av	N/av	N/av	N/av	1,070	958.90	
Eletrobras	N/A	N/A	N/A	N/A	N/A	N/A	180	328.54	
Rondônia	N/A	N/A	N/A	N/A	N/A	N/A	N/av	1,396,266.92	
Acre	N/A	N/A	N/A	N/A	N/A	N/A	N/av	96,033.61	
Piauí	N/A	N/A	N/A	N/A	N/A	N/A	N/av	3,391.49	
Transmission Losses									537,734.82
Eletrobras Companies	4,583,340	4,826,470	5,766,330	4,689,370	4,921,240	5,100,450	7,366,540	8,666,946	

1) N/A = not applicable; N/av = not available

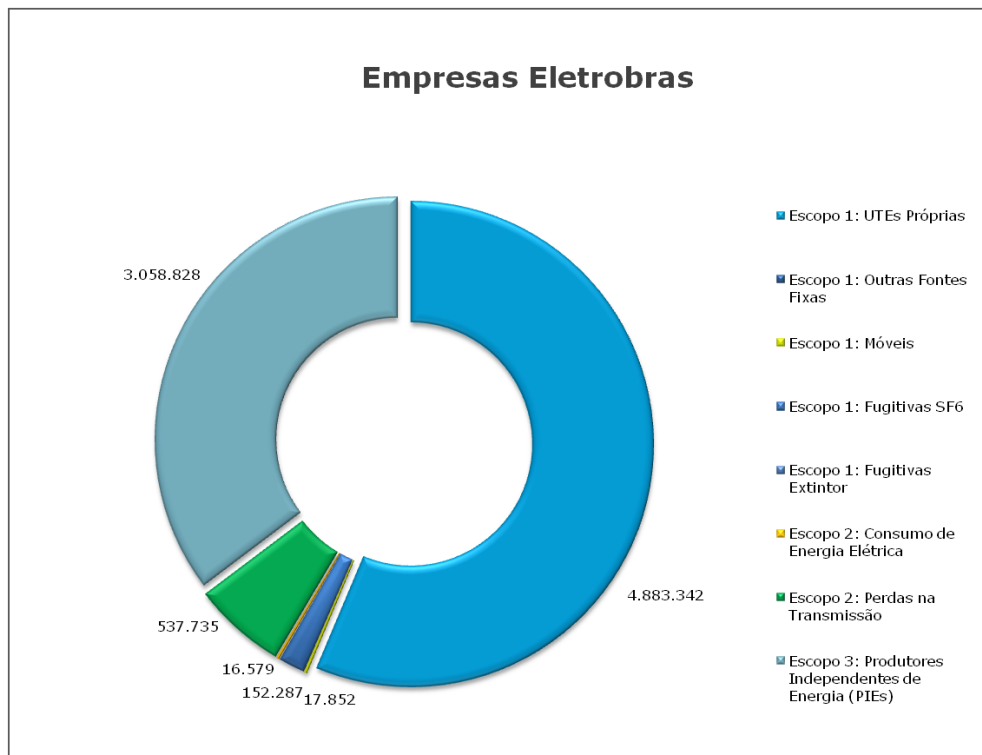
2) 1 Gg = 1,000 tons

It is expected that, in the short term, as the information gathering process for the annual GHG Inventory of the Eletrobras companies is further fine tuned, both by expanding the scopes and with more accurate measurements for a larger share of the organizational units of the companies, there will also be an increase in the total amount of GHG emissions. This increase, however, should not be significant, since it will reflect information from other less important

Inventory of Greenhouse Gas Emissions – base year 2010

contributions than those from stationary sources which clearly have greater weight and whose emissions are sufficiently known and reported. Even with a change of approach in organizational boundaries, by including the equity shares of the Eletrobras companies, this reasoning can still be considered valid.

It is also possible, that over a longer time period, with effective environmental management actions geared toward a climate strategy, there will be a stabilization, or even decrease in emissions from Eletrobras companies.



Scope 1: Own Thermoelectric Plants; Scope 1: Other Stationary Sources; Scope 1: Mobile; Scope 1: Fugitive SF₆; Scope 1: Fugitive – Extinguishers; Scope 2: Electricity Consumption; Scope 2: Transmission Losses; Scope 3: Independent Power Producers (IPPs).



Inventory of Greenhouse Gas Emissions – base year 2010

Table 3.5 - GHG Emissions of the Eletrobras Companies - base year 2010 (tCO₂e)

Eletrobras Companies	Scope 1					Scope 2		Scope 3	SUBTOTAL BY COMPANY	SHARE OF EACH COMPANY
	Own Thermoelectric Power Plants	Other Stationary Sources	Mobile	Fugitive SF ₆	Fugitive - Extinguishers	Electricity Consumption	Transmission Losses	INDEPENDENT POWER PRODUCERS (IPPs)		
CGTEE	1,340,439.37	N/av	294.86	N/A	1.12	64.23	N/A	N/A	1,340,799.59	15.47%
Chesf	4,644.42	54.29	4,137.16	16,974.60	17.98	255.98	a.g.	N/A	26,084.43	0.30%
Furnas	2,538.15	N/av	5,407.89	93,457.20	N/av	3,991.60	a.g.	N/A	105,394.84	1.22%
Eletronorte	468,198.81	6.69	84.45	21,910.80	6.02	232.34	a.g.	N/A	490,439.11	5.66%
Eletronuclear	N/A	2.78	1,096.33	N/A	23.46	6,782.97	N/A	N/A	7,905.53	0.09%
Eletrosul	N/A	100.01	1,657.06	8,704.36	2.87	883.24	a.g.	N/A	11,347.53	0.13%
Amazonas Energia	3,067,521.26	N/av	54.83	2,280.00	3.90	3,517.50	N/A	1,567,690.97	4,641,068.47	53.55%
Itaipu	N/A	28.30	1,637.53	7,410.00	2.10	114.09	N/A	N/A	9,192.01	0.11%
Cepel	N/A	56.75	633.36	45.60	1.53	221.66	N/A	N/A	958.90	0.01%
Eletrobras	N/A	N/av	55.69	N/A	1.15	271.69	N/A	N/A	328.54	0.00%
Rondônia	N/A	N/av	670.15	136.80	1.62	20.76	N/A	1,395,437.59	1,396,266.92	16.11%
Acre	N/A	3.80	274.70	N/av	0.21	55.01	N/A	95,699.89	96,033.61	1.11%
Piauí	N/A	4.91	1,847.96	1,368.00	2.57	168.05	N/A	N/A	3,391.49	0.04%
Transmission Losses							537,734.82		537,734.82	6.20%
SUBTOTAL BY SOURCE	4,883,342.01	257.54	17,851.96	152,287.36	64.53	16,579.12	537,734.82	3,058,828.45	TOTAL (tCO₂e)	8,666,945.79
SHARE OF THE SOURCE	56.34%	0.00%	0.21%	1.76%	0.00%	0.19%	6.20%	35.29%		
TOTAL BY SCOPE	5,053,803.40					554,313.94		3,058,828.45		

Legend: N/A = not applicable N/av = not available a.g. - amount reported only for the group of companies

FINAL CONSIDERATIONS

Any initiative in terms of inventorying or reporting greenhouse gas emissions (GHG) for which a corporation is responsible should be based on a recognized and well-defined methodology and present, as clearly as possible, all the considerations and premises adopted for defining the boundaries of responsibility and the content of the emissions presented.

In compliance with the Environmental Policy of the Eletrobras companies, and in line with its Sustainability Policy, approved in September 2010, this inventory consolidates and makes public the estimated amount of greenhouse gas emissions from the Eletrobras companies in 2010.

During this period, greenhouse gas emissions (GHG) were estimated at around 8,700,000 tons of CO₂ equivalent.

Considering that the quantity of energy generated by all electric power generation sources used by the Eletrobras companies was 186,620,693 MWh, its GHG emissions rate was 0.0464 tCO₂e / MWh, which is considered low when compared to other corporations in the world in the same sector and of equivalent size.

Average emission intensity (tCO₂/MWh) of the electric power sector

	tCO ₂ /MWh
World¹	0.520
OECD*¹	0.440
Other countries¹	0.600
Eletrobras Companies²	0.046

* OECD members are high-income economies with a high Human Development Index (HDI) and are considered developed countries, with the exception of Mexico, Chile and Turkey.

¹ Amounts in relation to 2008. Source: International Energy Agency (IEA). Climate and Electricity Annual, 2011.

² Amounts in relation to 2010.

The Eletrobras companies continue to support actions geared toward expanding the use of renewable sources of electricity, with an emphasis on wind power and increased energy efficiency.

Likewise, they continue to promote the development of studies and research aimed at enhancing the level of knowledge of processes that cause global warming. This is especially so in relation to the issue of estimating GHG emissions in hydroelectric reservoirs. In this case, Eletrobras and its generation companies have actively participated in the development of technologies and methodologies to ensure that emissions from hydroelectric reservoirs can be reliably estimated, as demonstrated by the Balcar Project (Carbon Balance), currently underway, which aims to measure GHG emissions and other parameters in eight hydroelectric reservoirs distributed throughout the country, in addition to three other locations for future reservoirs. The technical staff from the Environmental departments has been following developments in international studies in this field of knowledge, but is aware of the fact that, in

Inventory of Greenhouse Gas Emissions – base year 2010

Brazil, there is a wide variety of cases to be examined⁸. To date, in the national and international arena, scientists have not yet reached a consensus on the most reliable methodology for estimating GHG emissions from water bodies in general and, especially, from hydroelectric reservoirs.

Therefore, the non-participation of hydroelectric generation in this inventory is justifiable.

⁸ Each reservoir has its own peculiarities: size, geographic location (latitude), biota, type of vegetation and soil under submersion, biological processes, input of sediment and organic load coming from the contribution basin, and more. Therefore, the results from studies done on a given reservoir in Brazil cannot be extrapolated to others. The extrapolation of results leads to significant errors, because there is still no scientific basis for making generalizations in this field of knowledge

Climate Strategy

The Eletrobras companies have been conducting an annual GHG Inventory of the Eletrobras companies, seeking to cover the largest possible number of its organizational units, taking into account Scopes 1, 2 and 3 of the GHG Protocol, and publicly releasing the results thereof.

At the same time, in order to help meet the goals of the Strategic Action Program - PAE 2009-2012 (ISE-Bovespa and DJSI) and other demands (Carbon Disclosure Project - CDP, ICO₂, etc.), they have been promoting the integration of GHG emission data into the Database of Project IGS – Social-environmental Indicators for Corporate Sustainability Management of the Eletrobras Companies, as well as:

- Support the Sustainability committees of the Eletrobras companies and their deliberations, providing support in issues concerning climate change;
- Promote, monitor and participate in studies and research for the development of knowledge, technologies and methodologies for estimating GHG emissions from water bodies and reservoirs of hydroelectric power plants;
- Support corporate initiatives and actions aimed at energy efficiency and environmental conservation;
- Accompany the progress of regulations and standards in regard to air emissions, especially the development of ISO standardization norms that deal specifically with GHG emissions;
- Participate in specific forums on climate change in Brazil and abroad, in particular the Brazilian Forum on Climate Change (FBMC), prioritizing those with specific technical councils on the subject;

In order to improve the management of GHG emissions, in a transparent and effective manner, it intends to:

- Develop a plan with voluntary measures for the management of GHG emissions for the Eletrobras companies, prioritizing: the replacement of vehicle fleets and other fixed units for others that consume less carbon-intensive fuels; planting trees; reducing electricity consumption and losses in the transmission/distribution systems; optimizing the use of Sulfur Hexafluoride (SF₆) and adopting, wherever possible, clean technologies in all the processes and activities of the companies;
- Include in the inventory the record of atmospheric emissions - SO_x, NO_x and particulates (monitored, controlled or estimated), in accordance with CONAMA Resolutions and current legislation;
- Promote, monitor and participate in the development of studies and research on renewable electricity sources and energy efficiency as ways of reducing GHG emissions;
- Promote, monitor and participate in studies and research on the vulnerability of the Brazilian Electric Power System, in light of the consequences of climate change;



Inventory of Greenhouse Gas Emissions – base year 2010

- Promote, monitor and participate in studies, research and risk analyses of business ventures, taking into account the scenarios of declining rainfall and reduced flows in the rivers of drainage basins, and incorporating such information into the expansion strategies of the Eletrobras companies;
- Promote, monitor and participate in studies and research for adapting and mitigating the effects of climate changes on projects from the Eletrobras companies.

Bibliographic References

- **IPCC 2006**. Guidelines for National Greenhouse Gas Inventories. Volume 2: Energy. International Panel for Climate Change. 2006.
- **WRI, 2004**. The Greenhouse Gas Protocol - A Corporate Accounting and Reporting Standard. World Resources Institute (WRI). World Business Council for Sustainable Development (WBCSD). Revised Edition, 2004.
- **Eletrobras 2008**. Inventory of Greenhouse Gas Emissions of the Eletrobras System - 2005
- **Eletrobras, 2009**. Inventory of Greenhouse Gas Emissions from Thermoelectric Power Plants (stationary sources) for 2003 to 2008
- Strategic Action Program of the Eletrobras System (PAE 2009 - 2012)
- **FBDS, 2010**. Brazilian Foundation for Sustainable Development. (Web site) <http://www.fbds.org.br/fbds> Corporate Sustainability.
- Kyoto Protocol – 1997
- **MCT, 2004**. Initial National Communication of Brazil to the United Nations Framework Convention on Climate Change – November 2004
- "Carbon credits potential for PROINFA", Report from UNIFACS/2004 MME/Department of Energy Development – DDE
- Eletrobras Sustainability Report – 2008
- Sustainability Policy of the Eletrobras Companies - 2010
- Environmental Policy of the Eletrobras Companies - 2010
- Specifications of the Brazilian GHG Protocol Program. Accounting, Quantification and Publication of Corporate Inventories of Greenhouse Gas Emissions - Second Edition
- International Energy Agency (IEA). Climate and Electricity Annual, 2011. Available at: <http://www.iea.org/Textbase/npsum/climate_elec_annual2011SUM.pdf>

WEB SITES

<http://www.amazonasenergia.gov.br/>

<http://www.cgtee.gov.br>

<http://www.furnas.com.br/>

<http://www.chesf.gov.br/>

<http://www.eln.gov.br/>

<http://www.eletronuclear.gov.br>

<http://www.eletrosul.gov.br>

<http://www.itaipu.gov.br>

<http://www.cepel.gov.br>

<http://www.eletrobras.com/>

Economia do Clima, 2010.

<http://www.economiadoclima.org.br/site/>

