Climate change and energy efficiency

CLIM0001

EE and Climate Changes integration actions in Brazil

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1 - Introduction-

This project has been developed under the contract of the European Commission with reference EuropeAid/130075/C/SER/BR to support the sectoral dialogues EU – Brazil. This report intends to present an overview of Energy Efficiency and Climate Changes sectors in Brazil, the successful integration, cooperation and joint actions between these sectors, their legal framework, and barriers to overcome and indicates conclusions and recommendations to achieve common goals. The final goal is to propose, based upon the two reports produced under the scope of this contract, considering EU experiences, actions and policies for both EE and Climate Changes sectors to accomplish common goals.

2 - Brazilian competent authorities of Energy Efficiency and Climate Change, their competences and developed incentives

We present the relevant Brazilian authorities respectively in the areas of EE and Climate Change, as well as describe their tasks, areas and activities.

2.1- Energy Efficiency

The Brazilian EE structure is officially led by the MME – Ministry of Mines and Energy, which in relation to the operation of the programs and initiatives of EE, has competence to formulate energy policies, although other players have important roles (fig 1). The Energy Planning and Development Secretariat of MME (SPDE) is in charge of formulating the politics and coordinate of all actions of EE. Subordinate to SPDE are the PROCEL and CONPET, respectively the EE programs of electrical sector and oil and gas sector, whose attributions will be described further. The Energy Development Department (DNDE) is the operational area of SPDE with the responsibility of conducting the actions.

Acting in parallel we have the ANEEL – The National Agency of Electrical Energy, which is the regulatory and supervisory agency for the electrical sector, and is in charge of running the PEE – Utilities EE program.

Likewise we have the ANP – National Oil, Natural Gas and Biofuels Agency, which is the regulatory and supervisory agency for the Oil, Natural Gas and Biofuels sector, which also has the attribution of promoting EE, but until now has not set up an area of EE.

Other important player in the EE structure is the EPE – Energy Planning Company, responsible for formulating studies and researches to support the Energy Sector planning, including as regards the EE.

A player that develops a very important supporting activity for the EE programs is INMETRO – National Institute for Metrology, Standards and Industrial Quality, which by its PBE – Brazilian Labeling Program, implemented in partnership with PROCEL and CONPET, promotes the EE labeling of many equipments and products.

Another important supporting player is The BNDES – Brazilian Bank for Economic and Social Development, which created a fund for financingESCOs named PROESCO.
The mechanisms to promote EE can be of various formats and approaches. Currently in Brazil, may be mentioned, among others:

- Institutions of fostering: PROCEL, in the electricity sector, and CONPET, for fuel. The first runs under Eletrobras since 1985, and the second under Petrobras, from 90s. PROCEL has distinguished action in the sector, with several programs in all activity sectors - residential, public and commercial, industrial, with actions ranging from awareness in schools to direct implementation of EE measures.

- Labeling and standardization: these mechanisms exist in many countries of the world and have represented a large portion of the conservation achieved. They aim to increase the efficiency of end-use equipment and make use of two procedures: labeling, that informs the user the proven efficiency of the equipment which is acquiring and standardization, which acts generally compulsory by removing from the market less efficient equipment. The two mechanisms are not excluding, rather, their combination produces the best results. Brazil, to that effect, has been achieving excellent results, starting with labeling that allows the gathering of manufacturers, setting increasingly challenging targets for the products, and when this process is mature, enacts the law with the minimum performance required. Associated to the labeling we have the Seals PROCEL and CONPET, which classify the best products using the results of the Brazilian Labeling Program, PBE, without relying on the tax incentive mechanisms observed in other countries.

- PEE (EE Program): This plan, which requires electricity distribution companies to implement a portion of its net operating revenue in the final use of energy, is the main provider of resources to increase the efficient use of energy. It has undergone a number of revisions.

- ESCO Market: ESCOs in Brazil are created to operate in implementing EE measures, mainly through performance contracts are engineering firms, with little capital, making it difficult to obtain financing. Therefore, BNDES created PROESCO linking the borrower to secure financing, which should leverage this market.

Under these concepts, it is possible to classify the mechanisms to encourage EE in two major profiles:

- Technology: imply implementing new processes and using new equipment to reduce energy losses;

- Behavioral: is founded on changes in habits and usage patterns, reducing energy consumption without modifying equipment energy converters.
2.1.1 MME

Ministry of Mines and Energy - MME / SPDE/ DNDE

The Ministry of Mines and Energy - MME (Ministério de Minas e Energia) is the Federal Government entity responsible for the execution of energy-related policies within the country. Its paramount attributions include the formulation and the implementation of policies for the energy sector, according to the guidelines defined by the National Energy Policy Council - CNPE.

The MME is responsible for setting up the planning for the domestic energy sector, monitoring Brazilian Power Sector safety of supply, and for defining preventive actions to preserve safety of supply in case of imbalances between supply and demand of electricity.

The duties of the Secretary of Energy Planning and Development - SPDE on EE are:

- Develop long-term structural actions for the implementation of sectoral policies;
- Support and encourage the national energy capacity management;
- Advise and encourage sustainable business energy;
- Coordinate actions of energy development, particularly in the areas of renewable energy and EE.

Likewise, the Department of Energy Development - DNDE, subordinate to SPDE, is responsible for:

- Coordinate actions and strategic plans for energy conservation;
- Propose requirements and priorities for research and development of energy conservation technology to EPE and other educational and research institutions;
- Promote and coordinate national programs for the conservation and rational use of electricity, oil and oil products, natural gas and other fuels;
- To promote, coordinate and support the policies and programs for sustainable use and conservation of energy in less developed regions;
- Promote the development and testing of models of EE and rational use.

2.1.1.1 CGIEE - PNEF

The Ministry of Mines and Energy (MME) published on October 19, 2011, Ordinance No. 594 approving the "National Plan for EE - PNEf - Assumptions and Basic Guidelines". With the goal of saving 106,600 GWH in a period of 20 years, PNEf established a set of actions for a number of areas such as industries, buildings, public buildings, public lighting, sanitation, solar water heating; research and development (R & D), Measurement and Verification (M & V), international partnerships, and funding initiatives.

The document guides the actions to be implemented in order to achieve energy saving goals in the context of the National Energy Planning. Also, it will be formed a working group to detail and put into practice the guidelines established by PNEf. Therefore, the National Plan for EE -
PNEf is the instrument of detailing and operating the strategies outlined in the Efficiency Policy and in PNE.

The strategies and development actions contemplated in the policy should be detailed in mechanisms, infrastructure and budgets needed to ensure the planned target for the PNE in 2030.

The PNEF indicates the need to ensure sustainability of EE, as this "virtual power plant" can provide good business and profits for the market.

2.1.2 ELETROBRAS

Eletrobras - Centrais Elétricas Brasileiras SA, established in 1962, is a mixed capital company and traded under the ownership control of the Brazilian Federal Government, which operates in the areas of generation, transmission and distribution of electricity. The company leads a system composed of 12 subsidiaries, a holding company (Eletrobras Eletropar), a research center (Eletrobras Cepel) and half the capital of Itaipu Binacional.

Present throughout Brazil, Eletrobras is responsible for 37% of total generation capacity of the country. It has an installed capacity of 42,080 megawatts and 164 plants - 36 hydroelectric and 128 thermal plants, two thermonuclear plants.

It has over 58,000 kilometers of transmission lines in operation, in high and extra-high voltage, which corresponds to 57% of the national total. The company also promotes the efficient use of energy through the National Program for Energy Conservation (Procel).

2.1.2.1 PROCEL

One option to minimize the effects of the policy of low rates maintained during the 80s was the implementation of a conservation policy on the use of electricity, which resulted in the creation of PROCEL in 1985, under the coordination of ELETROBRAS.

By the Interministerial Act No. 1877 of 30/12/85, was established as a joint initiative of the Ministry of Mines and Energy - MME and the Ministry of Industry and Trade - MIC, the Program for Electrical Energy Waste Combat - PROCEL, subsequently renamed National Program for Electrical Energy Conservation - PROCEL.

PROCEL was the first structured initiative aimed at the efficient use of electricity, through actions aimed at rationalizing electricity, seeking, according to Ordinance No. 1877, maximizing its results and promoting new initiatives. The program aimed to combat waste in the production and use of electricity, providing the same product or service with lower consumption due to higher EE, thus ensuring an overall reduction of costs and investments in new system installations electric. On July 18, 1991, by Presidential Decree, PROCEL was transformed into a government program, expanding its scope and responsibilities, and interactions with direct repercussions on society as a whole. The program was no more restricted only to the electricity sector, articulating, now, with all sectors related to the production and use of electricity. To implement the Program were created the Coordinating Group for Energy Conservation - GCCE as coordinating body PROCEL, and the Executive Secretariat - SE GCCE, subject to ELETROBRAS, as the executive body.
2.1.2.2 PROCEL Main features

Launched in 1985 by the Ministry of Mines and Energy

Executed by Eletrobras (national utility holding company in electric energy generation, transmission and distribution)

Mission

• To promote the efficient and rational use of electricity
• To combat electric energy waste
• To reduce environmental impacts
• To generate benefits to society

Goals

• To change energy consumption habits
• To demonstrate and disseminate measures that promote cost reduction and the rational use of electricity

Guidelines

• To disseminate the concepts of rational and efficient use of electric energy
• To develop demonstration projects
• To support the technological development in this area
• To stimulate the enforcement of laws and regulations focusing on energy efficient measures
• To act through partnerships according to society needs

Annual Investments Budget

<table>
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<tr>
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<th>2007 (R$ million)</th>
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2.1.2.3 PROCEL Seal

In 1993 was created the Seal PROCEL Energy Saving, aiming to guide the consumer and
encourage the production and sale of more efficient products in the country. The following year were established jointly with manufacturers, consumers (represented by IDEC - Brazilian Institute of Consumer Protection) and INMETRO (National Institute of Metrology, Standardization and Industrial Quality), the criteria for awarding the Seal, its brand, and the basis for the achievement of this whole process. In 1995, already appeared in the Brazilian market the first products with the PROCEL Seal: one door refrigerators, two doors refrigerators and upright freezers. Subsequently, considering its participation in national electricity consumption were incorporated other categories: chest freezer, Domestic Air Conditioning - window type, three phase electric motors up to 10 hp (today covering up to 250 hp), flat panel solar thermal collector for water heating for bath and pools and thermal reservoirs.

The criteria currently in force for granting the PROCEL Energy Saving Seal are:

- The manufacturer / importer must agree to the terms set out in the PROCEL Seal Regulation;

- The product must primarily attend the PBE, which is coordinated by INMETRO;

- The product must undergo annual performance tests in reference laboratories indicated by PROCEL.

- The product must meet the performance criteria and safety requirements of the respective specific criteria for granting PROCEL Seal; it must be affixed on the products on display at points of sale in order to easily guide the consumer at time of purchase.

According to the classification obtained by the product in the labeling process, receive the PROCEL seal equipment level "A". After tests in laboratories, the models are classified according to EE from A to G, A being the highest efficiency level.

It is important to report that initially PROCEL Seal was designed for rewarding the most efficient among all products in a category. However it was observed that this strategy besides not pleasing manufacturers did not meet the main goal of the label which is to offer consumers options to buy efficient appliances. Attention then turned to an intermediate phase in which the three more efficient products were awarded, but this strategy also proved somewhat effective. Thus was set the current strategy of rewarding products labeled with A, adding specific criteria for obtaining the Seal.

An important evolution was the inclusion of requirements aimed at environmental protection in some of the specific criteria for the granting of PROCEL Seal, for certain equipment. In the case of washing machines criteria related to water consumption, and in case of refrigerators and freezers, elimination of CFCs in foam expansion. The trend is for gradually incorporate this type of requirements for all products according to the characteristics of each one.

Each year expanding its activities to include new categories of products, currently PROCEL Seal is awarded to various products. In 2001 we were awarded 312 models of 28 participants companies with equipment ranked in 12 categories. In 2011, the Seal PROCEL was granted to 3,784 models in 32 product categories with a total of 209 companies honored.1

The PROCEL results of 2011 totaled 6363 million kWh of energy saved and 2605.83 MW of peak demand withdrawn.

The management program is conducted in partnership with Inmetro within the PBE. In this sense, PROCEL acts in the qualification of independent laboratories, assists in establishing indexes of electricity consumption related to EE Law (10.295/2001), as well as provides

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1 Source: Resultados Procel 2012 ano Base 2011
subsidies to develop technical standards for testing EE.

### 2.1.2.4 PROCEL Edifica (Buildings Program)

PROCEL Edifica subprogram is responsible for promoting EE and environmental comfort in new buildings and in existing buildings in Brazil. The electricity consumption in this sector is quite significant, around 45%, if we consider the sum of residential, commercial and services. With economic stability observed in recent years and the consequent increase of income of the population, it is estimated that consumption will continue to rise. This is because more people have access to consumer goods with new technologies, which mostly consume electricity.

In 2003, PROCEL Edifica launched its Action Plan with contributions from various stakeholders of the building industry and academia, aimed at acting in various activities: training, new technologies, information dissemination, subsidies for sector regulation, housing and EE and, finally, support, marketing and financing.

With the same philosophy already adopted in other countries, the labeling of buildings was developed similarly to labeling of household appliances and equipments. Aiming to improve levels of sustainability of buildings, PROCEL Edifica topped the development of criteria for the labeling of buildings with national characteristics and thinking about electricity. To achieve this goal, was convened the National Institute of Metrology, Quality and Technology - Inmetro, which already acts as a partner in PROCEL Seal, indicating efficient household appliances and equipments in the market within the Brazilian Labeling Program (PBE).

From the partnership with Inmetro, arises the National Program for Buildings Labeling. Known as PBE Edifica, this program meets the guidelines of the MME, the National Energy Plan 2030 - PNE 2030, Decennial Plan of Energy Expansion - PDE 2007/2016 and also the National Plan for EE - PNEF.

Regarding the use of electricity, PBE Edifica defines the procedures required for Brazilian buildings incorporate sustainability concepts into the construction or renovation (by the choice of materials or efficient techniques) and also during use / operation.

The criteria for buildings labeling are described in the following documents prepared by a Technical Secretariat, consisting of experts in the field:

- Technical Regulation on Quality Level for EE of Commercial Buildings, and Public Services - RTQ-C (2009);
- Technical Regulation on Quality Level for EE of Residential Buildings - RTQ-R (2010), and
- Regulation of Conformity Assessment, of RTQ-C and RTQ-R, RAC-C and RAC-R.

In buildings labeling may be used two evaluation methods: prescriptive method with equations, tables and limit parameters or simulation method - which compares the performance of the building with other of reference.

This process is still voluntary, but PNEF already projects minimum levels of performance and efficiency in new buildings, and mandatory labeling for public buildings by 2020, commercial buildings, and buildings for residential services by 2025 and 2030. Until then it is necessary that transformation occurs over the entire chain of the construction industry and to consolidate the concept of national labeling in buildings.

The Network for EE in Buildings – R3E was created, by bringing together laboratories qualified
by PROCEL since 2003 in Environmental Comfort and EE. There are 12 laboratories, 01 lab specialized in natural ventilation for buildings, 07 specialized in training, and multiplication of professionals for the Building Sector on the use and application of technical regulations. The other 04 laboratories, asked the INMETRO accreditation to become Accredited Inspection Bodies - OIA, authorized to issue labels for buildings Residential, Commercial, and Public Service. This network aims at an effective market transformation by providing greater flexibility in the process for labeling buildings in the country.

The cooperation agreement between the Energy Agency of Portugal - ADENE, Inmetro and PROCEL, signed in July 2012, has enabled the expanding the exchange of information, and relevant technical and operational data with the objective of creating an environment of international cooperation involving the themes EE and renewable energy, facilitating the development of specific activities of common interest to Brazil and Portugal.

In 2012 was launched the software Thermoenergetic Building Simulation - Domus PROCEL Edifica. This program is adapted for the regulations of the PBE Edifica and can perform analysis by prescriptive and simulation methods, with the issuance of a "virtual label," even though without legal value, since this requires the label to be issued by an OIA.

PROCEL Edifica established periodical reviews in its Action Plan, in order to discuss and rethink the progress of planned actions. Many barriers must be transposed because Brazilian society, despite worrying about the purchase of more efficient equipment and appliances, has not yet incorporated this concept to the construction sector.

In the buildings sector, it is estimated that energy savings can reach 30% in existing buildings. For new buildings, practices such as design and efficient technologies can reduce consumption by up to 50%. It is necessary to create an awareness of more sustainable buildings, with higher environmental comfort, for both the general population and to the industry representatives.

### 2.1.3 PETROBRAS

Petróleo Brasileiro SA or Petrobras is a simply traded company (corporation), in whose majority shareholder is the Government of Brazil (Union). It is, therefore, a state-owned mixed capital company.

Established on October 3, 1953 and headquartered in Rio de Janeiro, the leader of the oil sector in Brazil, currently operates in 28 countries, in the energy segment, in the following sectors: exploration and production, refining, marketing and transportation of oil and natural gas, petrochemical, distribution of derivatives, electrical energy, biofuels and other renewable energy sources.

#### 2.1.3.1 CONPET

Aiming for the efficiency in the use of oil derivatives and natural gas, as well as their increasing EE in both the supply and the final uses, whether in public or private initiative, and seeking to develop a more comprehensive conservation energy to the oil and gas, was established in 1991 by Presidential Decree, the "National Program for the Rational Use of Oil and Natural Gas", CONPET.

CONPET is managed by the General Coordinator, responsibility of the Director of the DNDE, and the Executive Secretary of the Program, responsibility of a Petrobras director, which provides technical and administrative support to the program, through the Program Executive
The main purpose and goal of CONPET are, respectively, "develop and integrate the actions aimed at rationalizing the use of petroleum and natural gas" and "obtain an efficiency gain of 25% in energy use of petroleum and natural gas over the next 20 years, without affecting the level of activity".

The program has four main guidelines:

- Promotion and dissemination
- Permanent attitude in energy rationalization
- Increasing EE of equipment and systems
- Regionalization

The functions of CONPET should cover six areas: institutional, transportation, industrial, residential / commercial, agricultural and power generation.

Eliminate waste of diesel is cause for attention and priority by the CONPET. In the transportation sector, which accounts for over 50% of the consumption of this derivative in the country, waste is significant. It is estimated that the complete elimination of this waste would lead to very significant savings (somewhere around $ 1,000 million / year).

Partnerships between the private sector and CONPET led a project to encourage rational use of diesel and lubricating oils in companies, focusing on the proper use of the fleet of trucks and buses, in addition to the fuel storage system. CONPET began in 1994 a project to guide truckers at gas stations on highways called "SIGA BEM (GO WELL)" Its goal is to provide truckers with information on how to reduce consumption of diesel, after a diagnosis on the state of his vehicle.

The project operates through trucks checking centers at gas stations on the road, strategically located. Diagnoses are free. The driver receives technical information on how to rationalize fuel consumption, through videos and leaflets.

The ECONOMIZAR Project involves cargo and passenger transportation companies that operate their own garages where vehicles are refueled and / or which have a workshop for mechanical repairs. The goal is to guide these companies on improving the management of the use of diesel and measures of professional skill of drivers and mechanics.

This project works through mobile units that visit companies, evaluating consumption and vehicle emissions. Moreover, evaluates methods for managing the use of fuels and qualification of drivers and mechanics and care with the receipt and storage of diesel.

"SIGA BEM (GO WELL)" and "ECONOMIZAR (SAVE)" are the main CONPET projects in this sector.

The initiatives of CONPET were virtually nonexistent about encouraging the introduction of energy efficient technologies, such as the production of vehicles with lower specific consumption of gasoline, diesel or ethanol. This situation changed after 2010 with the implementation of cars labeling in partnership with Inmetro.
2.1.3.2 CONPET Seal

CONPET Seal aims to highlight to consumers, those models which achieve maximum degree of EE on the National Energy Conservation label of the Brazilian Labeling Program of INMETRO. Awarded annually by Petrobras, the Seal is a stimulus to the manufacturing of more efficient models.

CONPET Seal is in force since August 2005, and is targeted to equipments consuming oil and natural gas that achieved the lowest fuel consumption rates.

It is granted voluntarily to all products obtaining the concept "A" (most efficient) in laboratory tests conducted by the Brazilian Labeling Program (PBE). The criteria are based on data of fuel consumption, performance or EE, published by INMETRO.

Models granted with CONPET Seal:

- Gas water heaters, tankless and accumulation types
- Domestic Gas Stoves and Ovens

2.1.4 INMETRO

Inmetro – National Institute of Metrology, Quality and Technology is a Federal Agency subordinated to the Ministry of Development, Industry and Foreign Trade (MDICT). Inmetro was created by law in December, 1973, to support Brazilian enterprises, to increase their productivity and the quality of goods and services.

Its major task is to improve the quality of life of the ordinary citizen as well as to seek the competitiveness of the economy through metrology and quality.

Some highlights amid its duties are:

To implement the national policies on metrology and quality

Verify compliance with the technical and legal standards, with regard to units of measurement, measurement methods, materialized measures, measuring instruments and products pre-measured;

Keep and maintain the standards of units of measurement, as well as deploy and maintain the traceability chain of standards of measurement units in the country, so as to make them harmonious internally and consistent at international level, aiming at primary level, its universal acceptance and secondary level, their use as a support to the productive sector, regarding the quality of goods and services;

Strengthen the country's participation in international activities related to metrology and quality, and promote exchanges with foreign and international entities and agencies;

Provide technical and administrative support to the National Council of Metrology, Standardization and Industrial Quality - Conmetro, as well as its advisory committees, serving as its Executive Secretariat;

Source: www.conpet.gov.br
Increase the use of technical quality management in Brazilian companies;

Plan and execute the activities of accreditation of calibration and testing laboratories, proficiency testing providers, certification bodies, inspection, training and other, needed to develop the infrastructure of technological services in the country, and

Coordinate deployment of conformity assessment programs in the areas of products, processes, services and personnel, compulsory or voluntary, involving the adoption of regulations.

2.1.4.1 Brazilian Labeling Program - PBE

PBE was officially created in 1984, through a protocol signed between MDICT and the Brazilian Association of Electrical and Electronics Industry - ABINEE, with the intervention of the MME. Its goal is to provide consumers with information about the energy consumption of products so they can choose the highest EE, enabling reduction of new investment in electricity production and reducing costs for the population in general.

In 1984, Inmetro started with the society to discuss the creation of programs of conformity assessment with a focus on performance, with the aim of contributing to the rationalization of energy use in Brazil by providing information on the EE of equipment available in the domestic market.

Initially designed to the automotive industry, because of the oil crisis affecting the world in the 70's, this project was redirected, expanded and was named Brazilian Labeling Program (PBE).

Integrate PBE, conformity assessment programs that use the National Energy Conservation label to provide information about the performance of the products regarding their EE.

Its objectives are:

• Provide useful information to influence the purchasing decisions of consumers, who can take into account other attributes beyond price, when buying products.

• Fostering the competitiveness of industry through the induction process of continuous improvement promoted by the conscious choice of consumers.

PBE encourages innovation and technological evolution of products and acts as a tool for reducing energy consumption and is aligned this way, with the goals of the National Energy Plan (PNE2030) and the National Plan for EE (PNEF).

The program also contributes to the effective enforcement of Law 10 295 of 17 October 2001, known as the EE Law, which provides for a National Policy for Conservation and Rational Use of Energy:

"Art 3rd The manufacturers and importers of machinery energy consumers are obliged to take the necessary measures to be in compliance with the maximum levels of energy consumption and minimum EE (...)"

... and Decree 4059 of December 19, 2001 - Regulating the Law 10 295.

"Article 9 INMETRO is responsible for the supervision and monitoring of programs for conformity assessment of machinery and energy-consuming devices to be regulated."

Consequently PBE establishes compulsory requirements regarding product performance based
on the establishment of minimum levels of EE by the Steering Committee of Indicators and Levels of EE (CGIEE).

Currently, PBE is composed of 38 Conformity Assessment Program in different stages of implementation, which come from the labeling of white goods such as stoves, refrigerators and air conditioners, up to the latest demands in the area of renewable resources (solar heating and photovoltaic systems) and other more complex and with great potential of energy savings for the country, such as buildings and vehicles.

Increasing in the number and complexity of programs is an inevitable trend, noting that the National Plan for EE (PNFacebook), considers the PBE strategic, to achieve the goals set in the National Energy Plan (PNE2030).

The PBE programs are developed in partnership with CONPET and PROCEL, that awards the most efficient products on the EE labeling of Inmetro with seals.

2.1.4.1.1 Labeling

Conformity assessment occurs through several mechanisms, one of which is Labeling, in order to evaluate requirements related to product performance mainly as its EE. It is a way to highlight, through the National Energy Conservation Label (ENCE), the attendance to minimum performance requirements (and in some cases, in addition, also security) established in standards and technical regulations.

The ENCE classifies equipment, vehicles and buildings by colored bands, usually from "A" (most efficient) to "E" (less efficient), and provides other relevant information, for example the fuel consumption of vehicles, and efficiency of centrifugation and water use in washing machines.

Products currently labeled:
- Accumulation Electric Heater
- Accumulators for Photovoltaic Systems
- Ceiling Fans
- Centrifugal Pumps
- Charge Controllers
- Commercial Electric Oven
- Compact Fluorescent Lamps with Integrated Reactor
- Decorative Lamps - Incandescent Line
- Domestic Air Conditioning - Window Type
- Domestic Gas Stoves and Ovens
- Electric Showers Heads
- Electromagnetic Ballasts for lamps High Intensity Discharge
- Electromagnetic Ballasts for Tubular Fluorescent Lamps
- Flat panel solar thermal collector - Bath
- Flat panel solar thermal collector for Solar Swimming Pool Heaters
- Freezers
- Gas water heaters, tankless and accumulation types
- Heat Pumps
- High Pressure Sodium Lamp
- Hybrid Electric Accumulation Heater
- Inverter DC / AC
- Lamps for domestic use - Incandescent Line
- Microwave Ovens
- Passenger and Commercial Light Vehicles
- Photovoltaic Module
- Plumbing, Electrical
- Point-of-use electric water heaters
- Refrigerators
- Residential, Commercial and Public Services Buildings
- Solar heater panels with integrated storage tank
- Split Type Air Conditioner
- Systems for Wind Energy
- Table Fans
- Tanks Solar Thermal
- Televisions (Stand-by)
- Three Phase Electric Motors - High Performance Type
- Transformers for Distribution Network
- Washing Machines
- Whirlpool Bathtubs
- Whirlpool Electric Heaters
2.1.5 Energy Research Company – EPE

Created by Law 10.847/04 and established by Decree 5.184/04, the Energy Research Company - EPE (Empresa de Pesquisa Energética) is a company attached to the MME with the purpose to carry out studies and research in order to provide background information to Brazilian energy sector planning activities.

Its paramount attributions include the provision of studies and projections regarding the Brazilian energy mix, the execution of surveys to support integrated planning of energy resources, the development of studies to support generation and transmission expansion short-, medium- and long-term planning efforts, the performance of power generating plants feasibility studies which include both technical-economic and social-environmental aspects, as well as the coordination of efforts to obtain pre-construction environmental licenses for hydro power plants and transmission lines.

Should be highlighted among its duties:

- Conduct studies and projections of the Brazilian energy matrix and,
- Preparing and publishing the National Energy Balance - BEN.

Specifically regarding EE, EPE is incumbent upon:

- Promoting research and produce information to support plans and programs of environmentally sustainable energy development, including EE;
- Promoting plans geared targets for the rational use and conservation of energy, being permitted to establish collaborative partnerships to this end.

2.1.5.1 National Energy Plan 2030 – PNE 2030

The National Energy Plan - PNE 2030 aims at long-term planning of the energy sector of the country, marking out trends and alternatives for expansion of this segment over the coming decades.

The PNE is composed of a series of studies that seek to provide inputs to formulate energy policies according to an integrated view of available resources.

According to the PNE 2030, National EE Policy will be built in aiming at guiding:

- A set of priority and consistent projects, to be conducted under the guidance of MME, in coordination with the other agents of the Government.
- The inclusion of EE in the energy sector planning, consistent with the National Energy Matrix - MEN, the National Energy Plan - PNE and the Ten Year Plan for Electricity - PDEE.
- Strategic planning and priority actions of PROCEL and CONPET and other programs that may be defined for specific areas.
- The formulation of effective regulatory mechanisms and instruments for inspection by

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3 Source: www.inmetro.gov.br
regulatory agencies in the energy sector - ANEEL and ANP.

- The provision of funding by official financial agents in accordance with guidelines and lines of action established.

- The policy on R & D in the area of EE through coordination of resources and institutions involved.

- The design and implementation of EE projects in the utilities, in compliance with the regulations established by regulatory agencies.

- The establishment of an operational structure able to manage implementing this Policy, endowed with human and budgetary resources consistent with the importance of this mission.

One of the most important issues identified in long-term studies of the expansion of electricity supply, certainly is the anticipation of a transition from a predominantly hydraulic expansion, for an expansion with a relevant thermal participation.

The choice of which sources will be part of the new matrix of expansion of electricity generation is based on technical studies, but should be regarded as a strategic decision of government. The social and environmental concerns are a factor present in these studies, which supports the inclusion of clean sources.

The strategic choice to invest in EE is the option that less harms the environment, creating jobs and a growing expectation of increasing its competitiveness compared to other options for expanding the supply of energy.

### 2.1.6 ANEEL

The National Electric Power Agency - ANEEL (Agência Nacional de Energia Elétrica) was created by Law 9.247/96 and established by Decree 2.335/97. Its responsibilities are to regulate and inspect production, transmission, distribution and commercialization of electricity so that quality of provided services and universal access to electricity are assured. ANEEL is also responsible for the establishment of tariffs for end consumers, in a way that the economic and financial feasibility of power sector Agents and of the Industry as a whole is preserved. The changes brought about in 2004 by the new model made ANEEL responsible for promoting, directly or indirectly, auctions for the Distribution Agents to purchase electricity through long term contracts within the National Interconnected System (Sistema Interligado Nacional), SIN.

The duties of ANEEL on EE are:

- Approve procedures and methodologies for optimizing the operation of the interconnected and isolated systems, for access to the transmission systems and distribution and trading of electricity;

- Encourage combating energy waste with respect to all forms of production, transmission, distribution, trading and use of electricity;

- Encourage and participate in the research and development necessary for the electricity sector;

- Encourage and participate in environmental actions aimed at the benefit of society as well as interact with the National Environmental System in accordance with the law and acting in harmony with the National Environmental Policy.

2.1.6.1 The EE Program – PEE

Since 1995, the federal government decided to ensure that utilities of electricity distribution newly privatized, invested in EE, including clauses in contracts for this purpose. Later, in July 2000, was created the law nº 9991. This law provides for the investment of 1% of utilities net sales in research and development programs and EE. Until the present time many changes have occurred changing the guidelines for the use of these resources, including the period during the electricity rationing in 2001. Over US$ 2,000 million were already invested so far.

From the first cycle (1998/1999) PEE has undergone significant changes. None of the parties involved, companies and ANEEL, knew early on how to conduct such projects and therefore the program has undergone many changes over time.

In 2005, ANEEL determined that at least 50% of the funds were aimed for the low-income residential consumers (adequacy of residential electrical installations and equipment donation as efficient CFLs and refrigerators).

In recent years the ANEEL Manual for Development of EE Program, limited programs to projects developed in commercial and services buildings, industrial and residential installations, rural installations, utilities (water, sewage, gas distribution, collection and treatment of waste), government services, solar heating to replace electric shower and serving low-income communities.

Many electricity utilities had been using the proposed projects to develop performance contracts. ANEEL regulated this procedure by limiting the maximum amount to be invested in projects with contract performance in 50% of the total PEE. Other measures were adopted to regulate this procedure, and the most controversial is requiring the utility to reverse the gains from performance contracts in new financing EE projects, also through performance contracts, in later cycles.

Conduct measurement and verification campaigns (M & V) of project results is another important development in order to verify the actual savings achieved.

In 2010 the government approved Law No. 12.212 that established the application of at least 60% of the resources in the PEE programs for the efficient use of energy by low-income residential consumers benefited by social tariff. The same law established new distribution in resource allocation for R & D and EE. So, until December 31, 2015 resources will be 0.5% for both R & D and for EE. From 01.01.2016 the percentage for EE will come down to 0.25%.

From 2008 to 2012, ANEEL has recorded 926 EE projects submitted by electricity distribution companies (dealers and licensees), with investments of R $ 2.5 billion. These projects involve initiatives related to solar heating, for municipal energy management, cogeneration, and educational projects aimed at changing consumer habits, among others. Altogether, there was an energy saving of approximately 2.5 million megawatt hours / year (MWh/year).

Considering the average consumption of 150 kWh / month per consumer unit, was obtained a demand reduction during peak hours (between 18h and 21h) of 790 thousand kilowatts (kW).

In the same period, were also performed replacements or installation of equipments to combat energy waste. Among the actual and projected values we highlight the exchange of almost 630 thousand refrigerators, in addition to distributing 16.8 million CFLs.
2.1.7 National Agency of Petroleum, Natural Gas and Biofuels - ANP

The National Agency of Petroleum, Natural Gas and Biofuels (ANP), established in 1998, by Decree No. 2455, is the regulatory body for the activities within the industry of oil and natural gas and biofuels in Brazil.

Federal agency under the MME, the ANP is responsible for implementing the national policy for the energy sector of oil, natural gas and biofuels, according to the Petroleum Law (Law 9.478/1997).

The ANP rules through ordinances, resolutions and normative instructions; promotes bids and conclude contracts on behalf of the Union with dealers for exploration, development and production of oil and natural gas, and surveys the activities of regulated industries, directly or through agreements with other public agencies, among other duties.

The ANP also participates in the Program of Air Pollution Control by Motor Vehicles (PROCONVE), developing standards with locations and deadlines for the adoption by the Brazilian fleet of buses and trucks, types of diesel less polluting. The Agency also participates in the government working group that draws up the first national inventory of emissions for heavy vehicles, light vehicles and motorcycles, established by the Ministry of Environment.

2.1.8 BNDES

The Brazilian National Economic and Social Development Bank (BNDES) is the main financing agent for development in Brazil. Since its foundation, in 1952, the BNDES has played a fundamental role in stimulating the expansion of industry and infrastructure in the country. Over the course of the Bank’s history, its operations have evolved in accordance with the Brazilian socio-economic challenges, and now they include support for exports, technological innovation, sustainable socio-environmental development and the modernization of public administration.

The Bank offers several financial support mechanisms to Brazilian companies of all sizes as well as public administration entities, enabling investments in all economic sectors. In any supported undertaking, from the analysis phase up to the monitoring, the BNDES emphasizes three factors it considers strategic: innovation, local development and socio-environmental development.

Considering the attention given to the environment and the social problems vital to development, the BNDES offers especially elaborated support for projects in the social and environmental development areas.

Through financing with specific conditions, non-refundable resources or subscription of securities, the Bank enables efforts that reflect in social environmental development and better living conditions for people.

2.1.8.1 PROESCO and ProCopa Tourism

The evolution of the EE sector in Brazil showed the need to have mechanisms that ensure the financing of projects and performance contracts drafted by ESCOs.
Thus, aimed at projects that contribute to EE, PROESCO was created by BNDES - National Bank of Economic and Social Development, and the MME - Ministry of Mines and Energy.

With the same philosophy of environmental protection projects, PROESCO offers a credit line of R $ 100 million for ESCOs use in their contracts and projects, endorsing 80% of its total funding.

PROESCO was designed to overcome a major barrier to the development of the EE market, estimated at R $ 200 million per year and creates opportunities for the whole market, creating new business opportunities for utilities, efficient equipment manufacturers, energy user companies and especially for ESCOs.

The end uses and processes that contribute most to the energy savings are the focus of PROESCO: lighting, motors, process optimization, compressed air, pumping, air-conditioning and ventilation, refrigeration and cooling, production and distribution of steam, heating, automation and control, power distribution and energy management.

Another line of credit is the BNDES Program of Tourism for the World Cup 2014 - BNDES ProCopa Tourism Sustainable Hotel. Its goal is to finance the construction, renovation, expansion and modernization of hotels that obtain certification in the Sustainability Management System for Hosting, acknowledged by an accreditation entity accredited within the Brazilian System of Conformity Assessment, in order to increase hosting capacity and quality, according to the 2014 World Cup.

Another line of credit focused on 2014 World Cup is the BNDES ProCopa Tourism - Hotel EE, aiming to finance the construction, renovation, expansion and modernization of hotels that obtain EE certification at level "A" by the Program for EE in Buildings - PROCEL Edifica.

2.1.9 MMA

Considering the growing importance of the issue in national and international policy the federal government is developing a number of specific actions focused on mitigation and adaptation to climate change. Thus, the Ministry of Environment, through the Department of Climate Change and Environmental Quality, is also working with the Reducing Emissions from Deforestation and Forest Degradation (REDD), a concept that emerged in the United Nations Framework Convention (UNFCCC) held in 2003. After COP-13, the concept was expanded passing to be designated as REDD +, including the task of forest conservation, sustainable management and enhancement of carbon stocks. About the adaptation to climate change, actions are being conducted for federative articulation, in order to harmonize the Climate Policy and for the insertion of adaptation guidelines for major events such as the World Cup 2014. With regard to the protection of the ozone layer to maintain the climatic balance, the Department of Climate Change and Environmental Quality has also contributed for a strict management of equipment and products with CFCs and its substitutes, seeking compliance with the requirements and goals of the Montreal Protocol.

2.1.10 – Considerations about national experience in EE

2.1.10.1 Evolution of EE mechanisms in Brazil

In the 70s, with the oil crisis many countries have changed their energy policies, noting the importance of EE. However, with the relative stability of oil prices in the 80s, investments in EE
were relegated to a second plan. Concern about climate change and environmental risks at the end of the twentieth century, renewed the importance of EE in governmental energy policies. In Brazil programs such as National Alcohol Program - PROÁLCOOL, PROCEL and CONPET Programs and important institutional actions as the contractual obligation of electricity distribution companies to invest a percentage of its revenue in EE Programs (PEE) and the EE Law, work as support mechanisms for EE.

It deserves to be highlighted establishing voluntary or compulsory standards and / or EE labels for the equipments. The Brazilian Labeling Program (PBE) began to be implemented from 1985.

A first effort institutional of energy conservation, with clearly defined goals in the area of liquid fuels, the Protocol was signed in 1979 between the Ministry of Industry and Trade and ANFAVEA, claiming 20% reduction in fuel consumption by ethanol powered automobiles. PROÁLCOOL was the first effective program implemented in Brazil in the area of liquid fuels. Its first step was ethanol added to gasoline, and the second stage, after 1979, was addressed to hydrated ethanol powered engines (not just by the addition of ethanol to gasoline). It was therefore the introduction of new technology and not just the improvement of existing ones.

Another important theme was the issue of fuel oil consumed in industries. Since 1980, the National Petroleum Council (CNP) raised prices, and ordered cuts from 10% to 5%, in supplying fuel oil and diesel for industry and implemented fuel quotas until 1983. To mitigate the negative reaction among entrepreneurs, the federal government created in 1981, the CONSERVE program, with the aim of encouraging conservation and substitution of fuel oil consumed in the industry, being the first major action of energy conservation in Brazil. Protocols were developed which took effect on EE of sectors such as cement, steel and paper / pulp. However, occurred actually more actions of energy replacement than of energy conservation. There was also an underutilization of resources allocated to the program, due to the bureaucracy, the recession of 1981-85 periods and the lack of a clear signaling by the government regarding the path of economic and energy policies. Conservation initiatives ended up losing importance.

Except PROÁLCOOL, most of these programs were discontinued with the fall in oil prices in the second half of the 80s, making it difficult to justify conservation programs in an environment of falling prices and plenty of oil.

Another instrument of policy used was encouraging the substitution of fuel oil for electricity, of hydraulic origin, for thermal uses. With the increasing use of electricity for thermal purposes in industry, promoted in part by CONSERVE, and in part by the electrothermal program, happened in fact a transfer of the responsibility about the conservation of energy to the electricity sector, as increased demand by electric power to thermal purposes in industry limited the supply capacity of the sector, plunged into financial crisis because of the tariffs containment policy to try to curb hyperinflation of that period.

So it was decided to a policy of energy conservation, with the creation of PROCEL in 1985, which was the first systematic initiative to promote the efficient use of electricity in Brazil.

Following the model adopted by PROCEL, was decided to create a similar program for the oil and natural gas, was thereby established CONPET in 1991. With activities basically of articulation, the performance of CONPET in the past was limited mainly to the conception of conservation and to establish partnerships with final consumers of fuel and with the other bodies of PETROBRAS.

Besides engaging in different energy sources, in the past, there was no coordination between the PROCEL and CONPET, in order to establish an integrated policy for EE, allowing make the
most of the efforts and investments undertaken separately. With PNEf the time is right to initiate this integration. Today there is more recognition that EE is intrinsically linked to increased productivity and environmental benefits.

### 2.1.10.2 National Experience in EE

After the Montreal and Kyoto Protocols, EE has become one of the preferred instruments for mitigating effects due to emissions for greenhouse gases and depletion of the Ozone Layer, and environmental pollutants. It was concluded that increasing efficiency is one of the most economical and environmentally friendly answer for part of the energy needs. Long time Brazil develops EE programs recognized internationally: PROCEL, CONPET and PBE.

The PEEs of the distribution utilities of electricity, regulated by ANEEL, ensure a regular flow of resources to efficiency projects. Completing this structure EE Law No. 10.295/01 allows the federal government to establish minimum levels of efficiency - or maximum consumption - to equipment manufactured or sold in Brazil.

Comparing the current situation with the scenario of 28 years ago when PROCEL was established, it turns out that the situation has changed and that several barriers were removed. In fact, today the market offers many efficient technologies at affordable prices. For this a fundamental role was played by the labeling and the awards, which helped disseminate efficient alternatives. Moreover, the control of inflation and the readjustments of energy tariffs and fuels have made attractive the options for technological modernization. The laboratory network, today strengthened and more capable, provides the necessary services to ensure product quality and consumer safety, recognized by labels and seals with the credibility of the brands INMETRO, CONPET and PROCEL.

Currently, Brazilian consumers, still relatively mobilized by residual memory of the 2001 energy crisis, remain sensitive to energy costs and the threat of shortages.

Summarizing, according to PNEf, national policy for EE will be built in order to guide:

- A set of priority projects and consistent, to be conducted under the guidance of MME, in coordination with the other agents of the Government.

- The inclusion of EE in the energy sector planning, in accordance with the National Energy Matrix - MEN, the National Energy Plan - PNE and the Ten Year Plan for Electricity - PDEE.

- Strategic planning and identifying priority actions of National Programs for Energy Conservation - PROCEL and CONPET and others that may be defined for specific areas.

- The formulation of effective regulatory mechanisms and instruments for inspection by regulatory agencies in the energy sector - ANEEL and ANP.

- The provision of funding by financial agents in accordance with official guidelines and action lines established.

- The policy on R & D for the area of EE through articulation of resources and institutions involved.

- The design and implementation of EE projects by utilities, in compliance with regulations established by regulatory agencies.

- The establishment of an operational structure able to manage the implementation of this
Policy, endowed with human and budgetary resources consistent with the importance of this mission.

The consistency of its national programs, the approach combining voluntary accessions with compulsory legislation, and the foundation provided by the funds arising of the utilities revenues make Brazil an international reference regarding the EE programs.

The Brazilian government decided to use its state-owned companies - Petrobras and Eletrobras - to run the two national programs for energy conservation and ANEEL to supervise the EE Program (EEP), run by the distribution utilities of electricity. Labeling of equipments constitutes another powerful tool that Brazil used to promote EE.

According to PROCEL, over 95% of energy savings estimated for 2011, was attributed to labeling of electrical equipment within the PBE and Seal PROCEL, which confirmed the rightness of EE Law, which establishes mandatory minimum efficiency levels for equipment and buildings.

Initially CONPET's activities have been concentrated mainly on personnel training, information dissemination and performing diagnostics on cargo vehicles and passenger cars. Later in partnership with PBE started labeling and launching of CONPET Seal for gas furnaces, stoves and water heaters. Further steps in all major consuming sectors, involving the labeling of light vehicles, pilot programs for energy optimization in small and medium industries, combating heat losses and promoting the use of natural gas in industrial cogeneration, are currently being developed.

In the case of PEE, most investments in the initial stages were to reduce technical losses in distribution networks, installation of energy efficient light bulbs in street lighting and performing energy diagnoses in industrial, commercial and services facilities. In the most recent cycles, it was observed an increase of actions to optimize energy management, often involving partnerships with ESCOs, industries and commercial establishments and service facilities.

Another important development is the requirement for campaigns of monitoring and verification (M & V), of the projects results.

### 2.2- Environment- Climate Change

The National Policy on Climate Change (PNMC) was established in 2009, through Law No. 12.187/2009. The PNMC has the objective of promoting the reduction of emissions of greenhouse gases in Brazil associated with the promotion of sustainable development based on the use of clean technologies, new production practices and the development and dissemination of knowledge.

The National Policy on Climate Change formalizes the voluntary commitment of Brazil to UN Framework Convention on Climate Change to reduce emissions of greenhouse gases between 36.1% and 38.9% of projected emissions by 2020.

The PNMC administration is up to the Interministerial Committee on Climate Change (CIM) and its Executive Group (GEx), established by Decree No. 6.263/2007. The instruments for their implementation are, among others: the National Plan on Climate Change, the National Fund on Climate Change and the Communication of Brazil to the UN Framework on Climate Change.
2.2.a Competent Authorities of the National Policy on Climate Change

The Brazilian government has developed a system of institutional administration to conduct its National Policy on Climate Change, based on four boards of articulation.

Implementation of the National Policy on Climate Change occurs in the following Institutional Forums.
Institutional instruments of the National Policy on Climate Change – Law nº 12187/2009

Interministerial committee on Climate Change - CIM
Decide, approves, and orients actions under the National Plan

Interministerial Commission on Global Climate Change - CIMGC
Designated National Authority in the framework of the Clean Development Mechanism - Kyoto Protocol

Executive Group on Climate Change - GEx
Coordinates the development and implementation of the National Plan and Sector Plans

Steering Committee of Climate Fund
Guides the investments carried out by the Climate Fund

Brazilian Climate Change Panel - PBMC
National Scientific body in the area of Climate Change

Climate Network
Produce data, information and knowledge about climate change, contributing to the formulation and monitoring of national policies

Brazilian Forum on Climate Change - FBMC
Assists the government in incorporating the theme of climate change in public policy
2.2.1 Civil House

According to the structure of the Brazilian government between the missions of the Civil House of the Presidency of the Republic shall:

I - assist directly and immediately to the President in the performance of their duties, in particular:

a) coordination and integration of government actions;

b) the prior verification of the constitutionality and legality of presidential actions;

c) the analysis of the merits of the appropriateness and compatibility of the proposals, including the matters in the National Congress, with government guidelines;

d) in the evaluation and monitoring of government action and the management of agencies and entities of the federal public administration;

II - to promote the publication and preservation of official acts.

Hence and considering the item Ia above, it is up to the Civil to coordinate the Interministerial Committee on Climate Change.

2.2.1.1 Interministerial Committee on Climate Change (CIM), a deliberative body coordinated by Civil House;

The Interministerial Committee on Climate Change (CIM) was established by Decree No. 6.263/2007 with the assignment to guide the development, implementation, monitoring and evaluation of the National Policy on Climate Change and the National Plan on Climate Change (PNMC).

Permanent, the committee consists of 16 ministries and the Brazilian Forum on Climate Change, coordinated by the Civil House and the principal representatives of each ministry should hold the position of Secretary or equivalent. The decisions of the CIM are institutionalized through resolutions.


The responsibility for the preparation, implementation, monitoring and evaluation of the National Plan on Climate Change was in charge of the Executive Group on Climate Change (GEx) within the CIM, which is coordinated by the Ministry of Environment, and composed of six other ministries, and the Brazilian Forum on Climate Change and Civil House.
2.2.2 MCTI

The Ministry of Science, Technology and Innovation (MCTI) was created on 15 March 1985. The MCTI has as competencies, the following subjects: the national policy for science, technology and innovation; planning, coordinating, supervising and controlling the activities of science and technology; policy on development of information technology and automation; national policy on biosafety, space policy, nuclear policy and control the exporting sensitive goods and services.

By incorporating the two major fostering agencies in the country - the Financier of Studies and Projects (FINEP) and the National Council for Scientific and Technological Development (CNPq) and its research units - the Ministry of Science and Technology now coordinates the work implementation of programs and actions that consolidate the National Policy on Science, Technology and Innovation.

We must highlight the role of the MCTI, which serves as the Executive Secretariat of the Interministerial Commission on Global Climate Change, responsible for CDM projects and the General Coordination of Climate General Changes (Department of Policies and Theme Programs - DEPPT / SEPED - Secretariat of Policies and of Research and Development Programs) responsible for Emissions Inventory and Communications under the Convention on Climate Change.

The Secretariat of Policies and Programs for Research and Development - SEPED aims to deploy and manage policies and programs aimed at developing scientific and technological innovation in the country: in the areas of Exact Sciences, of Engineering, Earth and Life in especially in Biotechnology and Health, Nanotechnology and the areas of strategic interest for the collection and the sustainable use of national assets, particularly in Biodiversity, Ecosystems, Meteorology, Climatology and Hydrology, Ocean Sciences, Antarctic and Global Climate Changes.

2.2.2.1 Interministerial Commission on Global Climate Change - CIMGC and its competences

The purpose of the Interministerial Commission on Global Climate Change, created by Decree of July 7, 1999, is to articulate actions at government level to implement the United Nations Framework Convention on Climate Change and its subsidiary instruments in which Brazil takes part.

The Commission shall be composed of representatives from the following bodies:

a) Ministry of External Relations;
b) Ministry of Agriculture and Supply;
c) Ministry of Transports;
d) Ministry of Mines and Energy;
e) Ministry of Planning, Budgeting and Management;
f) Ministry of Environment;
g) Ministry of Science and Technology;
h) Ministry of Development, Industry and External Commerce;
i) Civil Office of the Presidency of the Republic;

First paragraph. The State Minister of Science and Technology shall be the president of the Commission.
Second paragraph. The State Minister of Environment shall be the vice-president of the Commission, performing the president’s duties during the president’s absence.

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Third paragraph. The office holders of the bodies composing the commission shall indicate their representatives and alternate representatives, which will be designated by the State Minister of Science and Technology. The Ministry of Science and Technology shall serve as the Executive Secretariat of the Interministerial Commission and shall provide technical and administrative support to the work of the Commission. The attributions of the Interministerial Commission are:

I - to provide statements, whenever requested, on proposals for sectoral policies, legal instruments and norms that contain a relevant component for the mitigation of global climate change and the country’s adaptation to its impacts;

II - to provide inputs on the government’s positions in the negotiations under the United Nations Framework Convention on Climate Change and its subsidiary instruments in which Brazil takes part;

III - to define eligibility criteria additional to those considered by the bodies of the Convention in charge of the Clean Development Mechanism (CDM), as provided for in Article 12 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, pursuant to national sustainable development strategies;

IV - to analyze statements on projects that result in emission reductions and that are considered eligible to the Clean Development Mechanism (CDM), as provided for in Article 12 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, and approve them, when appropriate;

V - to cooperate with entities of the civil society to promote actions by governmental and private bodies in the implementation of the United Nations Framework Convention on Climate Change and its subsidiary instruments in which Brazil takes part;

2.2.2.2 National Emissions Inventory

Brazil presented in October 2010 the second National Emissions Inventory of Greenhouse Gases, covering the period 1990-2005. Emissions of greenhouse gases have increased by about 60% between 1990 and 2005, from 1.4 gigatons to 2.192 gigatons of carbon dioxide equivalent - and CO2e (as it considers all greenhouse gases), according to the document.

In this period, deforestation has been primarily responsible for the emissions of greenhouse gases. About 61% of total emissions in the period was caused by the sector of changes in land use and forests. Agriculture appeared then with 19% of national emissions and the energy sector with 15%. The inventory also considered emissions from industry and waste treatment, accounted for 3% and 2% of the national total, respectively.

The expectation, is that the numbers decrease in the next inventory, which should cover the period after 2005, when Brazil started to show decreasing rates of deforestation, mainly in the Amazon.

In 2009, deforestation in the Amazon was seven thousand square kilometers approximately. A number much lower than the nearly 20 000 recorded in 2005 and 25,000 in 2004. The trend is that Brazil registers a reduction to five thousand km² in the rate of 2010, ie a fall estimated to 25-30%.

2.2.2.3 Brazilian Network for Climate Change Research – Rede CLIMA

The Brazilian Research Network on Global Climate Change (Rede CLIMA) was established by MCTI in 2007 and is supervised by a Board and managed by an Executive Secretariat exercised by the National Institute for Space Research (INPE) and advised by a Scientific Committee. Its objectives are:
• generate and disseminate knowledge and technologies for Brazil to be able to meet the challenges represented by the causes and effects of global climate change;
• produce data and information necessary for the support of Brazilian diplomacy in the negotiations on the international regime on climate change;
• carry out studies on the impacts of global and regional climate change in Brazil, with emphasis on the country's vulnerabilities to climate change;
• assess alternatives for adaptation of social, economic and natural resources systems of Brazil to climate change;
• investigate the effects of changes in land use and on social, economic and natural resources systems in Brazilian emissions of gases that contribute to global climate change, and
• contribute to the formulation and monitoring of public policies on global climate change within the Brazilian territory.

The Board is responsible, among other things, to define the Network research agenda, advised by the Scientific Committee; promote the management of REDE-CLIMA, making all the decisions necessary for its proper functioning and articulate the integration of Rede programs and public policies in the area of global climate change.

The Scientific Committee of Rede CLIMA is composed of representatives of the sub-thematic networks and by scientists from outside the Rede. It will advise the Board on issues of research and evaluation of scientific results, in addition to drafting calling invitations to research.

2.2.3 Ministry of Environment – MMA

The Ministry of Environment (MMA), created in November 1992, aims to promote the adoption of principles and strategies for the knowledge, protection and recovery of the environment, the sustainable use of natural resources, the valuation of environmental services and insertion of sustainable development in the formulation and implementation of public policies, acting by transversely and shared, participatory and democratic ways at all levels and instances of government and society.

Law No. 10,683, of May 28, 2003, which provides for the organization of the Presidency and ministries, constituted as an area of competence of the Ministry of Environment the following subjects:

I - national policy for the environment and water resources;
II - policy of preserving, conserving and the sustainable use of ecosystems and biodiversity and forests;
III - propose strategies, mechanisms, and economic and social instruments to improve environmental quality and the sustainable use of natural resources;
IV - policies for the integration of environment and production;
V - environmental policies and programs for the Legal Amazon, and
VI - ecological-economic zoning.

2.2.3.1 Executive Group on Climate Change (GEx)

Coordinated by the Ministry of Environment, meeting monthly to discuss issues related to National Policy. The Executive Group on Climate Change (GEx), subordinated to the CIM, has competence to design, implement, monitor and evaluate the PNMC. It consists of eight ministries and the Brazilian Forum of Climate Change (FBMC) and is coordinated by the Ministry of Environment (MMA).
In the context of the GEx may be created working groups to discuss specific topics of the National Policy on Climate Change.

Its role in the elaboration and implementation of the PNMC is described below:
Governance of the National Plan on Climate Change

Interministerial Committee on Climate Change - CIM
- Decides, approves, and orients actions under the National Policy
- Coordinates the development and implementation of the National Plan and Sector Plans

Executive Group - GEx

Sectorial themes
- Adaptation MMA/MCTI
- Pricing instruments MF
- REDD MMA
- Ozone MMA

Sectorial Plans
- ABC Plan MAPA-MDA
- Steel Industry MDIC/MMA
- Industry Plan MDIC
- Mining MME
- Health M Saúde
- PPCerrado Casa Civil e MMA
- PPCDAM Civil House/MMA
- Transportation and Urban Mobility MCT/MF

Coordination
- Civil House The Presidency
- 16 Ministries + FBMC
- MMA
- 7 Ministries + FBMC

16 Ministries + FBMC
- 7 Ministries + FBMC

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2.2.3.2 CLIMATE FUND (FUNDO CLIMA)

The National Fund on Climate Change (Fundo Clima) was created by Law No. 12.114/2009 and regulated by Decree No. 7.343/2010. The Fund is an instrument of the National Policy on Climate Change (NPCC) instituted by Law n° 12.187/2009. It is intended to fund projects, studies and enterprises aimed at mitigating climate change and adapting to its effects.

The Climate Fund is attached to the Ministry of Environment (MMA) and provides resources in two modalities, namely reimbursable and non-reimbursable. The reimbursable resources are administered by the National Bank for Economic and Social Development (BNDES). The non-reimbursable funds are operated by MMA. A percentage of 2% of the annual budget is reserved for the payment of the financial agent and settlement of expenses related to administration and management.

Funding sources of Fundo Clima are:

- Up to 60% of the special participation that fits the Ministry of Environment in the resources from the oil production, according to clause II § 2 of art. 50 of Law No. 9478 of August 6, 1997;
- Appropriations contained in the Annual Budget Law (LOA) of the Union;
- Donations of national and international entities, whether public or private;
- Other arrangements set in the law of creation.

The Fund is managed by a Steering Committee chaired by the Executive Secretary of the MMA. The Committee must approve the proposed budget and Annual Plan of Resource Investment of the Fund, the PAAR. At the end of each year, must report on the application of funds.

The collegial body also has the authority to establish, every two years, guidelines and investment priorities. Finally, the Steering Committee has the task of authorizing projects financing and recommend the contracting of studies.

The current organization is outlined in the following figure:
2.2.3.2.1 Steering Committee – Management of Fundo Clima

The Steering Committee, composed of representatives of government and civil society, is bound to MMA, which coordinates, and has the assignments to approve the proposed budget and the Application Resources Annual Plan - PAAR, establish biennial guidelines and priorities in applying resources, approving plans and annual reports of activities and performance of the financial agent and of coordination of the Fund.

The Executive Secretary of the Fundo Clima is a management linked to the Department of Climate Change - DEMC of the Secretariat of Climate Change and Environmental Quality - SMCQ, with the assignment to perform the function of administrative and operational support to carry out the instruction, celebration and other procedures which have as their object the execution of projects supported by the Fund.

Fundo Clima management is organized to meet the three priority themes, namely: the feasibility of projects contracting, the necessary monitoring of project implementation and its monitoring results, and support the activities of the Steering Committee. In its first year, activities focused on the viability of projects and supporting the Steering Committee, it was not possible, given the reported conditions, to deepen and build the system for monitoring and tracking.

The Financial Agent of the Fund is the National Bank for Economic and Social Development - BNDES, as expressed in the law that created the fund.

From the standpoint of budget and finance resources, totals shown at the beginning of the year for 2011 were R$ 238,927,463.00 distributed as follows:

a) R $ 5,200,000.00 as reopening special credit from the 2010 budget, but with commitment and limit for moving (released at the end of the year).

b) R$ 233,727,463.00 Annual Budget Law (LOA) from 2011, of which:
   i) R $ 204,000,000.00 in reimbursable resources for project financing and R $ 4,200,000.00 to be transferred to the operating agent Fund, as administrative costs related to the management of which were effectively transferred R$ 4,000,000.00.
   ii) R$ 29,167,463.00 in grant resources.
   iii) R$ 560,000.00 for management and administration of the Program, to be administered by the Fund to carry out its activities.

However, the total amount available during the period was R $ 238,727,463.00, from the opening of a new limit at the end of the year.

Beyond the budget for 2011 quoted above, it is expected for 2012 approximately R$389,100,000.00, to which must be added to the years of the PPA 2012-2015, the estimated amount of R$1,275,544,166.00.

From the preliminary structuring of Fundo Clima, was opened the process of execution of the resources available for 2011. Such resources were divided into non-reimbursable under the direct responsibility of MMA, and reimbursable under the management of BNDES. From the point of view of reimbursable resources for BNDES start operating, there was a need for structuring Fundo Clima, both in MMA, as the BNDES. In this process, the MMA had to perform the procedures for transfer of funds from the budget to the BNDES, financially executing the budget available. A
similar process had to be done for non-reimbursable resources, organized in stages and phases.

2.2.3.3 National Plan on Climate Change

The National Action Plan on Climate Change was introduced on the 1st of December 2008 and aims to encourage the development and improvement of mitigation actions in Brazil, collaborating with the global effort to reduce emissions of greenhouse gases, as well as aims the creation of internal conditions to deal with the impacts of global climate change (adaptation).

The Plan is divided into four areas: mitigation opportunities; impacts; vulnerabilities and adaptation; research and development; and education, training and communication. Its main objectives are:

1) As a primary and main objective to identify, plan and coordinate actions to mitigate emissions of greenhouse gases generated in Brazil, as well as those necessary to adapt society to the impacts occurring due to climate change; and,

2) Encourage efficiency gains on the performance of economic sectors in the constant pursuit of the reach of best practices;

3) Maintain the high share of renewable energy in the electricity matrix, preserving the outstanding position Brazil has always occupied in the international scene;

4) Encourage the sustainable increase of the participation of biofuels in the national transportation matrix, and also act aimed at structuring to an international market of sustainable biofuels;

5) seek the sustained reduction of deforestation rates in its four-year average in all biomes, until it reaches zero illegal deforestation;

6) eliminate the net loss of forest cover area in Brazil by 2015;

7) Strengthen intersectoral actions aimed at reducing vulnerability of populations;

8) Seek to identify the environmental impacts of climate change and promote the development of scientific research in order to be able to develop a strategy that minimizes costs socioeconomic of adaptation of the Country;

The National Plan on Climate Change also presents some goals to reduce emissions of greenhouse gases, and to promote other socioeconomic benefits and environmental gains. Some of these goals are related to EE:

- Replace 1 million old refrigerators per year, in 10 years;

- Increasing the supply of electricity from cogeneration, mainly sugar cane bagasse, to 11.4% of the total electricity supply in the country in 2030;

- Reduction of non-technical losses in the distribution of electrical energy at the rate of 1,000 GWh per year for the next 10 years.

2.2.3.3.1- Sectorial Plans - Mitigation and Adaptation Sector Plans

To meet the voluntary commitment, Decree No. 7390/2010 provides for the elaboration of Sector Plans, including actions, indicators and specific targets to reduce emissions and mechanisms to verify its fulfillment.
It is noteworthy that besides containing a mitigation strategy, the Sector Plans should also include adaptation actions, defined by Law No. 12.187/2009 as initiatives and measures to reduce the vulnerability of natural and human systems face of the effects of current and expected climate change.

The formulation of Sector Plans forms the basis for the revision of the National Plan on Climate Change in 2012, one of the tools for the implementation of Law No. 12.187/2009. The Ten Year Energy Plan is one of Mitigation and Adaptation Sector Plans already completed and currently under revision.

2.2.3.4 MMA operational structure for the climate change sector

The operational structure of MMA Climate Change Sector is as follows

Competencies in each area:

The Secretariat of Climate Change and Environmental Quality is responsible for:

I - propose policies and regulations, and to define strategies on issues related to:

a) Strategic environmental assessment;

b) The various forms of pollution, environmental degradation and environmental risks;

c) Waste harmful to health and to environment;

d) The environmental impact assessment and environmental permits;

e) Monitoring the quality of the environment;

f) The development of new instruments for environmental management and

g) The development of environmentally sound energy matrix;

II - to propose, coordinate and implement programs and projects in its area of competence;

III - technically monitor and evaluate the implementation of projects in its area of competence;

IV - formulate, propose and implement prevention policies and environmental emergency assistance;

V - coordinate the actions of the Ministry related to climate change;

VI - to propose policies and economic instruments to regulate the carbon market (CDM);

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VII - coordinating the Brazilian participation in activities related to the Intergovernmental Forum on Chemical Safety;

VIII - promote technical and scientific cooperation with national and international bodies in the area of its competence;

IX - coordinate and implement public policies arising from international agreements and conventions ratified by Brazil in the area of its competence;

X - Develop studies and projects related to environmental preservation and reclamation of environmental damage caused by activities of the oil industry, and

XI - perform other activities as assigned in the area of its operations.

The Department of Climate Change is responsible for:

I - support and advise the various units of the Ministry and related entities on issues related to global climate change;

II - coordinating meetings intended to define the position of the Ministry related to global climate change;

III - monitor and support technically the Interministerial Commission on Global Climate Change;

IV - subsidize, assist and participate, in conjunction with the Office of International Affairs, in international negotiations and events related to global climate change;

V - Develop studies for the protection of global climate system and the ozone layer;

VI - develop policies and strategies for mitigation and adaptation to the consequences of global climate change;

VII - to support an expanded use of environmentally sound energy alternatives;

VIII - conduct studies for the formulation of policies and definition of economic instruments to regulate the carbon market (CDM);

IX - to coordinate and articulate, within the Ministry, the implementation of public policies arising from international agreements and conventions ratified by Brazil in their area of expertise, and

X - Perform other activities as assigned in the area of its operations.

Also competes to these areas of MMA, in relation to the theme Energy:

Formulating and proposing policies and standards and developing strategies related to environmental repercussions associated with the Brazilian energy matrix. In this sense, subsidizes the area and advises the various units of MMA and related areas, in matters related to energy theme in national and international level; subsidizes the MMA in their decision making regarding the Brazilian energy matrix; promotes coordination with different governmental and non-governmental organizations for the promotion of a clean energy matrix; develops studies and projects and supports initiatives aimed at expanding the use of alternative energy sources environmentally sound and socially just.

2.2.4 Brazilian Panel on Climate Change - national scientific body

On April 17th 2009 the Brazilian government established the Brazilian Panel on Climate Change. The initiative brings together 300 leading scientists and researchers from various institutions and universities. This forum, along the lines of the UN Intergovernmental Panel on climate, gathers 300
renowned scientists and researchers from various institutions such as Brazilian space agency, Embrapa, Coppe, university centers, among others, to update the data on climate change in the country.

The government makes use of the Brazilian Research Network on Global Climate Change (Rede Clima), established in 2007. With a interdisciplinary composition, including representatives of government and academia, the Network produces and promotes knowledge and technology on climate change, contributing to the formulation and monitoring of public policies in Brazil, focusing on the following areas: Cities, Coastal Zones, Economics of Climate Change, Water Resources, Regional Development, Renewable Energy, Agriculture, Health and Models.

Researchers from public and private institutions in Brazil are encouraged to organize and expand the scientific production on the impacts of climate change in the country.

Besides analyzing the scientific, technical and socioeconomic production on Climate Changes in all its aspects, the Panel has the task of placing this knowledge, organized as reports, available to the United Nations Framework Convention on Climate Change (UNFCCC), and to governments and all institutions and persons interested in the subject.

Facing the interference of human actions on the environment - which reached a global scale and unprecedented magnitude, affecting the natural functioning of the climate system - the public policy makers and society in general need objective information about the causes of climate change, its environmental and socioeconomic impacts, and possible solutions.

Based on this, the Brazilian Panel on Climate Change (PBMC) was established, in the molds of Intergovernmental Panel on Climate Change (IPCC). The role of PBMC is to gather, synthesize and evaluate scientific information on relevant aspects of climate change in Brazil.

The PBMC will provide technical and scientific information on Climate Changes from integrated assessment of technical and scientific knowledge produced in Brazil or abroad, on the causes, effects and projections related to climate change and its impacts, of importance for the country.

Information will be disseminated through the elaboration and periodic publication of National Assessment Reports, Technical Reports, Summaries for Policymakers on Climate Changes and Special Reports on specific topics.

The PBMC may support international cooperation among developing countries, for the promotion of national experience, share methods, results and knowledge in order to help countries strengthen their national capabilities for responses to climate change.

The panel consists of the following structure: Plenary Assembly, the Board, Scientific Committee, Executive Secretariat, Working Groups (Working Group 1, 2 and 3), Task Force on Methodologies for Emissions Inventories of Greenhouse Gases and Units Technical Support.

2.2.5 Brazilian Forum on Climate Change

To bring the topic of Climate Change at the heart of society was created the Brazilian Forum on Climate Change (FBMC) by Decree No. 3515 of June 20, 2000, aiming to "raise awareness and mobilize society for discussion and decision making "about the impacts of greenhouse gas emissions by human activities, which enhance the greenhouse effect.

The FBMC is chaired by the Brazilian President, and has as members State Ministers, Presidents of
Regulatory Agencies, State Secretaries of Environment, representatives of the Corporate Sector, Civil Society, the Academy, and Non-Governmental Organizations. The Forum has an Executive Secretary appointed by the President with the assignment of organizing the agenda and attend meetings and to adopt measures for the execution of the works and activities.

In April 2007, the President of the Republic, at the suggestion of the Ministry of Environment (MMA) and the Secretariat of the Brazilian Forum on Climate Change (FBMC), placed on the agenda of government activities to draw up a plan. This plan was initially called "National Action Plan to Combat Climate Change - PNMC ", oriented to structure and coordinate government actions concerning the impact of global warming arising from anthropogenic activities.

In order to meet this demand, the FBMC promoted several meetings which culminated in the drafting of a reference document entitled "FBMC Proposal for the National Action Plan to Combat Climate Change", being delivered to the President.

In the process of drafting the PNMC, the discussion regarding the plan was extended for the different sectors of society, as a way to contemplate the specific demands these stakeholders. Therefore, it became imperative to promote an agenda seeking to promote discussion and encourage participation of society through their representative bodies.

To attain these goals, the Executive Secretariat of FBMC, held Sector Dialogues in order to collect contributions for the construction of the PNMC. These dialogues consisted of a series of meetings with representatives from various sectors, whose objective was the mapping of actions already implemented, as well as the actions necessary to future implementation, regarding the structural axes composing the PNMC.

In sectoral dialogues and public consultations conducted, have been heard various sectors of society, such as industry, forestry, finance, agriculture, forest and land use changing, the municipalist movement, besides civil society and NGOs. Once the process of creating the Plan includes periodic reviews, dialogues with society should adopt a dynamic for consultation that allows this continuous dialogue with public administrators responsible for updating the plan. In this context, the role of FBMC has significant importance as in its institutional prerogatives fits to act as a promoter of dialogue between the government and society.

The Sector Dialogues raised a set of propositions presented in documents created and approved by the various entities constituting the consulted sector. These contributions after systematized by the Executive Secretariat of FBMC, were forwarded to the Executive Group of the Inter-Ministerial Committee on Climate Change (GEx), who considered for improving the Plan.

3 Brazilian Legislation on energy efficiency and climate change.

3.1 PPA Multi-annual Plan 2012-2015 – Law 12593/2012

The Multiyear Plan (PPA) 2012 – 2015, stated by Lau 12593/2012, defines all the policies and actions of the federal government, thus expressing the commitments of a presidential term. It sets out the projects and programs of long-term government, defining goals and objectives of public action for a period of four years. It is the primary planning tool of the Federal Government which aims, among others, to promote efficient use of government resources.

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The Multiyear Plan (PPA 2012-2015) is a planning tool of government action provided for by Article 165 of the Constitution. The importance of the Plan can be verified by the significant contribution of planned resources: R$ 2.4 trillion in 2004-2007 to R$ 5.5 trillion in the current Plan More Brazil (PPA 2012-2015). The plan has 65 thematic programs that articulate 492 goals and 2417 targets.

The tracking performance can be measured annually to the Annual Report Assessment of the PPA 2012-2015, as established by Decree No. 7.866/2012. For each of the 65 programs of the PPA, will be published the identification of updated index of indicators, the situational analysis of the objectives and targets and financial implementation of the initiatives, as well as evaluating the macroeconomic scenario.

Specifically, with respect to Climate Change was established the Thematic Program for Climate Change and Environmental Reparation, aimed at building a cohesive and consistent national policy able to prepare the country for the challenges arising from climate change.

3.1.1 Program 2050: Climate Change

According to the Multiyear Plan (PPA) 2012-2015, the program that covers the topic of Climate Change is the Program 2050, which covers six goals and their targets and initiatives, under the responsibility of the Ministry of Science, Technology and Innovation and the Ministry of Environment.

The program 2050 has a total budget of R$ 2,020,860, allocated between 2 goals under the responsibility of MMA, and 4 of MCTI responsibility. Among the objectives under the responsibility of MMA is the Goal 0698: "Develop and implement tools for mitigation and adaptation to climate change considering sustainable development and regional diversity."

Among the various initiatives under Objective 0698 stands out on the Elaboration of opportunities and challenges diagnosis about unconventional sources of energy consumption and efficient consumption.

For better understanding we detail below the Program 2050’s objectives:

Objective 0698:

"Develop and implement tools for mitigation and adaptation to climate change considering sustainable development and regional diversity."

Targets:

- Approve legal framework of the mechanism for reducing emissions from deforestation and forest degradation (REDD).
- Update the National Plan on Climate Change.
- Fostering the implementation of 40 projects and 20 enterprises that promote adaptation and mitigation to climate change.
- Implement the National Plan for Sustainable Production and Consumption.
- Monitor sectoral emissions of greenhouse gases.

Initiatives:
• Creating the legal and institutional mechanism for Reducing Emissions from Deforestation and Forest Degradation (REDD).

• Preparation of National Communication of Brazil to the Convention on Climate Change.

• Making a diagnosis on opportunities and challenges of unconventional sources of energy and efficient consumption.

• Support studies, projects and ventures aimed at mitigating and adapting to climate change.

• Implementation of the National Plan for Sustainable Production and Consumption (PPCS).

• Implementation of the National Plan on Climate Change.

• Implementation of the Brazilian Program for the Elimination Hydrochlorofluorocarbons (HCFCs).

• Continuous Monitoring Sectorial Emissions of Greenhouse Gases in Brazil.

• Operationalization of the Clean Development Mechanism (CDM).

Objective 0707:

Reduce risks and vulnerabilities environmental, economic and social, arising from climate change, desertification processes and land degradation, to minimize material losses, ecosystem impacts and promote socioenvironmental improvement through adaptation measures.

Targets:

• Update the National Action Plan to Combat Desertification and Mitigate the Effects of Drought.

• Develop the National Program for Climate Change Adaptation.

Initiatives:

• Ecological and socioenvironmental adequacy of instruments for the use, sustainable production and consumption in areas susceptible to desertification.

• Elaboration the National Program for Climate Change Adaptation.

• Identification, diagnosis and combating the desertification.

• Mapping, data interpretation, and reclaim of environmentally degraded areas undergoing desertification.

Still within the 2050 Program the following objectives will be undertaken under MCTI:

Objective 0536

Generate environmental scenarios, including regional particularities, by the construction of the Brazilian Model of the Global Climate System, for the formulation of public policies for mitigation, adaptation and vulnerability reduction.

Objective 0540:
Generate and disseminate knowledge and technologies for mitigation and adaptation to the effects of climate change through a network formed by public and privately funded research and teaching institutions (REDE CLIMA).

Objective 0734:
Assess the impacts of climate change on Brazilian natural systems, through the monitoring of emissions and observation of climate signs.

Objective 0990:
Expand the weather, air quality and climate forecast on regional and global scales.

3.1.2 PPA 2012-2015 programs regarding EE

According to the Multiyear Plan (PPA) 2012-2015, the Programs that covers the topics of Energy Efficiency are Program 2022 – Fuels and Program 2033 - Electric Energy, both mostly under the responsibility of the Ministry of Mines and Energy.

For better understanding we detail below the 2022 and 2033 Programs’ objectives related to EE:

Program 2022 – Fuels

OBJECTIVE 0604:
Stimulate energy efficiency measures in the use of derivatives of the Petroleum, Natural Gas and Biofuels that contribute to the rational use of these inputs.

Goals:
Raise the percentage of car models labeled by Brazilian Vehicle Labeling Program (PBE Vehicular) to 50%.
Avoid consumption of 650 million liters of diesel oil through energy efficiency measures.

Initiatives:
Promote awareness on the efficient use of oil derivatives and natural gas.

Promote studies and projects aimed at the regulation of Law No. 10.295, of 10/17/01, adding new equipment to the list of Indicators and Minimum Levels of Energy Efficiency and promoting improvements to existing ones, with regard to equipment that consumes derivatives of oil and natural gas.

Conduct studies and projects to stimulate energy efficiency measures in the use of oil, natural gas and biofuels.

Program 2033: Electric Energy

OBJECTIVE 0048:
Stimulate energy efficiency measures, which contribute to the optimization of the transmission, distribution and consumption of electrical energy.

Goals:
Save 20,000 GWh of electric energy consumption that would occur without conservation measures.

Initiatives:

Strengthen the activities of measurement and verification, in order to incorporate the results in studies of electric sector planning.

Encourage Replacement and Disposal of Obsolete Equipment.

Promoting Awareness About the Efficient Use of Electric Energy.

Promote synergy between the existing energy efficiency programs in the country.

Promote studies for the regulation of the Law n.º 10.295/2001, adding new equipment to the list of indicators and minimum levels of energy efficiency and promoting improvements to existing ones.

### 3.2 Brief History of Legal Frameworks

A seguir apresentamos um panorama resumido da evolução e estado atual do arcabouço legal que dá sustentação jurídica aos planos, programas e ações governamentais, respectivamente nas áreas de EE e de Mudanças Climáticas.

#### 3.2.1 Legislation on EE

- In 1981, through Ordinance MIC/GM46, CONSERVE Program was created in order to promote energy conservation in industry, to develop products and processes more energy efficient, and to stimulate substitution of imported energy sources by native alternatives. CONSERVE aimed to encourage the conservation and substitution of fuel oil consumed in industry, especially in steel, pulp and paper, and cement industries. The incentive was given to seize the surplus capacity of hydro electric generation for heat generation in industries (electrothermal).

- On April 2, 1982, Decree 87 079 approved guidelines for the Energy Mobilization Program - PME, a set of actions aimed at energy conservation and substitution of petroleum. PME was established with the aim of rationalizing the use of energy by getting the decrease in consumption of energy inputs and progressively replacing oil products by domestic alternative fuels. Energy conservation was a priority for the program.

- In 1984, Inmetro, implemented the Program for Energy Conservation in Electrical Appliances, aiming to promote the reduction of energy consumption in equipments such as refrigerators, freezers, and residential air conditioners. In 1992, this program was renamed, and from then on called Brazilian Labeling Program, having preserved its initial assignments, to which were added safety requirements and establishment of minimum levels of EE.

- In December 1985, through the Interministerial ordinance nº1877, of the Ministries of Mines and Energy (MME), and Industry and Trade (MIC), was created PROCEL - National Program for Energy Conservation, with the aim of integrating the actions for conservation of electricity, with a comprehensive and coordinated sight.

- In 1990, by Decree 99656, the federal government creates the Internal Commission for Energy Conservation - CICE, determining the installation of a CICE in all property belonging directly or indirectly to an agency or entity of the Federal Government, foundations, public and semi-public companies, that have an annual electricity consumption exceeding 600,000 kWh or an annual fuel consumption of more than 15 Toe (tons of oil equivalent), indicating an attempt to reduce energy waste in the Public Sector. CICE is up to the development, implementation and monitoring of Program for Energy Conservation’s goals, and dissemination of its results at each facility.
• On July 18, 1991, by Federal Decree was created CONPET - National Program for the Rational Use of Oil and Natural Gas. In this same document PROCEL assignments were revised. Both programs are intended to develop and integrate actions for the rational use of energy. It was established that actions of the program shall be supervised by the Coordinator Group of CONPET - GCC, comprising representatives from various ministries and federations of industry and commerce, and the actions of PROCEL shall be supervised by the Coordinator Group of Energy Conservation - GCCE, with composition similar to the GCC. By Decree, it was up to Petrobras to provide technical, administrative and financial support to the Program.

• On December 8, 1993, by Federal Decree was established the National Award for Conservation and Rational Use of Energy, for recognition of contributions for the conservation and rational use of energy. The Decree established that the award is conferred annually in the following categories: agencies and companies of public administration, energy sector companies, industries, commercial and services companies, micro and small enterprises, buildings, transportation and press. On the same date, another decree has created the EE Green Seal, with the goal of identifying the equipment presenting optimal levels of efficiency in energy consumption.

• On December 26, 1996, Law 9427 created the National Electricity Law, which was defined by Decree No. 2335 of 6 October 1997. The Decree established the guidelines of ANEEL, its basic structure and functions.

• On August 6, 1997 is enacted Law No. 9.478/1997 (Petroleum Law), which addresses the National Energy Policy and creates the ANP. This Law determines that one of the principles and objectives of the National Energy Policy is the national policy for the rational utilization of energy sources, aiming among others the objective of protecting the environment and promoting energy conservation. This law also states that it is up to ANP to enforce good practices of conservation and rational use of oil and natural gas and environmental protection.

• On July 24, 2000, is enacted Law No. 9991, which governs the investments in research and development on EE by the utilities, licensees and authorized companies of the electricity sector.

• On 17 October 2001, is enacted Law No. 10295, also known as the EE Law and corresponds to the principal regulatory matter in Brazil providing on a national policy for the conservation and rational use of energy, aimed at the efficient use of energy resources and the preservation of the environment. The federal government should establish maximum levels of specific energy consumption or minimum levels of EE of machines and energy-consuming devices, manufactured or sold in Brazil, based on relevant technical indicators that consider the equipment life. It also states that, one year after the publication of the levels of EE, a program will be established with targets for its progressive evolution, and requires manufacturers and importers of equipment to take the necessary steps to be in compliance with the maximum levels of energy consumption and minimum levels of EE, contained in the regulations set for each type of machine or device. Importers must also prove compliance to the levels established during the process of importing. The federal government is also up to develop mechanisms for promoting EE in buildings constructed in Brazil.

• Decree No. 4059 of 19 December 2001 regulates the EE Law by determining procedures for the establishment of indicators and levels of EE. The Decree created the Steering Committee of Indicators and Levels of EE - CGIEE, composed of representatives of the following organizations and entities:

  • Ministry of Energy and Mines (MME) (who heads the Committee);
  • Ministry of Science and Technology (MCTI);
  • Ministry of Development, Industry and Foreign Trade (MDICT);
  • National Electric Energy Agency - ANEEL;
  • National Agency of Petroleum, Natural Gas and Biofuels - ANP;
  • A representative from a Brazilian university expert on energy;
• A Brazilian citizen expert on energy.

The representatives are chosen for two-year terms that may be renewed for a similar period.

According to the Decree No. 4059, Article 3, it is up to CGIEE:

• Develop a work plan and a schedule to implement the application of EE Law;
• Prepare specific regulations for each device and machine consuming energy;
• Establish a program of targets stating the evolution of levels to be achieved for each regulated product;
• Establish Technical Committees to analyze and opine on specific issues under the guidance of CGIEE, including the participation of civil society representatives;
• Monitor and evaluate systematically the regulatory process and propose monitoring plan, and
• To deliberate on the propositions of the Technical Group for EE in Buildings.

ANEEL, ANP and INMETRO and the Executive Secretaries of PROCEL and CONPET provide technical support to CGIEE and to constituted Technical Committees.

3.2.2 Legislation on Climate Change

There are two laws directly related to climate change in force in the country: Law No. 12.187, of December 29, 2009, establishing the National Policy on Climate Change, and Law No. 12.114, of December 9, 2009, which creates the National Fund on Climate Change (FNMC). Law 12.187/2009 institutes the National Policy on Climate Change and establishes its principles, objectives, guidelines and instruments. The Policy and the consequent actions will observe the principles of precaution, prevention, of citizen participation and sustainable development.

The National Policy on Climate Change has, among others, the following objectives:

- Compatibility of economic and social development with the protection of the climate system;
- Reducing emissions and strengthening of anthropogenic removals by sinks of greenhouse gases in the country;
- Implementation of measures to promote adaptation to climate change;
- Conservation of environmental resources, with particular attention to major natural biomes taken as National Heritage;
- Consolidation and expansion of legally protected areas and encouraging reforestation and restoration of vegetation cover in degraded areas.

Among the instruments of the National Policy on Climate Change, appearing the National Plan on Climate Change already prepared by the Federal Government, the National Fund on Climate Change, created by Law 12,114 / 2009, Plans of Action for the Prevention and Control Deforestation in the biomes, as well as economic and financial mechanisms related to climate change mitigation and adaptation to the effects of climate change.

It is worth noting, though, contained in the Law 12.187/2009, the voluntary commitment of Brazil, made in Copenhagen to reduce its emissions of greenhouse gases by 36.1% and 38.9% compared to projected emissions by 2020.

To carry this commitment, several actions are planned, among which stands out the reduction of deforestation, accounting for about 75% of total carbon dioxide emitted by Brazil. The country already has important mechanisms to support efforts to control deforestation, such as the National Fund on Climate Change (FNMC) and the Amazon Fund.
The first, as already mentioned, was created through Law 12.114/2009, in order to ensure funds to support projects or studies and finance projects aimed at climate change mitigation and adaptation to climate change and its effects. Among the resources allocated to FNMC includes up to 60% of the resources of the special participation, in case of large volumes of oil production and high profitability of this production, intended for the Ministry of Environment.

The use of funds may be allocated to, among others, the following activities:

- Projects to reduce carbon emissions from deforestation and forest degradation, with priority to natural areas threatened by destruction and relevant to biodiversity conservation strategies;
- Research and development of systems and design methodologies and inventories that contribute to the reduction of net emissions of greenhouse gases and to reduce emissions from deforestation and land use change;
- Developing products and services that contribute to the dynamics of environmental conservation and stabilization of the concentration of greenhouse gases;
- Support for sustainable production chains;
- Payments for environmental services to communities and individuals whose activities demonstrably contribute to carbon storage, linked to other environmental services;
- Agroforestry systems that contribute to reducing deforestation and carbon absorption by sinks, and for income generation;
- land reclamation and forest restoration, prioritizing areas of Legal Reserve and Permanent Preservation Areas and priority areas for the generation and quality assurance of environmental services.

The financial agent of FNMC will be Banco Nacional de Desenvolvimento Economico e Social (BNDES), which will enable the Bank of Brazil, Caixa Economica Federal and other public financial agents to act in financing transactions with funds from FNMC.

The Amazon Fund, created by Decree No. 6,527, of August 1, 2008, consists of a specific account within the BNDES, for allocation of donations in kind to carry non-refundable applications in preventive, monitoring and combating deforestation actions and to promote conservation and sustainable use of the Amazon biome, covering the following areas:

I - Management of public forests and protected areas;
II - control, environmental monitoring and inspection;
III - sustainable forestry management;
IV - economic activities developed from the sustainable use of forests;
V - ecological and economic zoning, land use planning and land tenure regularization;
VI - conservation and sustainable use of biodiversity;
VII - recovery of deforested areas.

The activities listed above must comply with the guidelines of the Sustainable Amazon Plan (PAS) and the Plan for Prevention and Control of Deforestation in the Legal Amazon (PPCDAM). Up to twenty percent of the Amazon Fund resources may be used in the development of systems for monitoring and control of deforestation in other Brazilian biomes and in other tropical countries.

To complete the legal framework to fully endorse the mitigation of climate change, lack even the standards that should govern in the national sphere, the next period of international commitments under the United Nations Framework Convention on Climate Change. Even with the failure of COP 15 in Copenhagen, the Brazilian Parliament is aware of the issues, particularly with regard to the mechanism for Reducing
Emissions from Deforestation and Degradation (REDD), of special interest to Brazil.

In this regard, it should be mentioned the bill (PL) No. 5586 of 2009, which "establishes the Certified Emission Reductions from Deforestation and Degradation (RCEDD) and makes other provisions", subject of extensive discussion with technicians from the area and representatives of Government and civil society, embodied in Substitutive approved by the Environment and Sustainable Development Committee of the House of Representatives.

As the project was shelved at the end of the legislature and could not be reinstated, Mrs. Rebecca Garcia, who was the rapporteur on the previous Commission for the Environment and Sustainable Development (CMADS) at the House of Representatives, presented as the Substitute new bill: PL 195/2011. This restatement aims to continue the process of discussion and construction conducted during the year 2010, which involved several governmental and non-governmental sectors. The new project has the same content of the final version voted of the bill 5586 and started legal procedures initially passing by the Commission for the Environment and Sustainable Development (CMADS), in which was approved on June 8, 2011.

Besides the discussion occurs in the House of Representatives, Federal Senator Eduardo Braga also presented Senate Bill 212/2011. The content of the bill is the same text initially presented by Mrs. Rebecca Garcia in the House and is being debated in the Senate.

### 3.2.2.1 Comments on the Climate Change Legislation

Brazil has become one of the main references regarding the achievement of appropriate solutions, with strong and positive action in international forums since Rio 92. One of the landmarks of Brazilian action was the creation in 2009 of the law known as the National Policy on Climate Change.

This legislation also paved the way to implement the National Action Plan on Climate Change, which includes other integrated initiatives to reduce these emissions, ranging from the increased use of ethanol to doubling the planted forest area in Brazil, through improvement in efficiency in the productive sectors economy with more sustainable practices, and developing research to identify current environmental impacts.

Countries have different historical responsibilities in relation to the volume of emissions. Unlike developed nations (like the United States and European countries), the emissions of greenhouse gases in Brazil stems in large part from changing land use - the technical name for deforestation - mainly the Amazon and Cerrado biomes.

To contain the spread of this kind of devastation and, consequently, reduce CO2 emissions, the federal government launched in 2004 the Action Plan for Prevention and Control of Deforestation in the Legal Amazon (PPCDAm). The combination of more coordinated actions, satellite monitoring and support to more sustainable productive activities allowed the area of deforestation in the Amazon drop from 27,000 km² (in 2004) to 6000 km² (2011).

Is worth noting that from 2020 onwards, according to a new commitment agreed at COP 17, all nations need to take actions to mitigate the emission of greenhouse gases, whether or not considered developed countries. This will require negotiating, financing, training and knowledge exchange.

The PPCDAm is just one of the tools created by the Brazilian government to contain the advance of climate change. Beyond it are the ongoing Action Plan for Prevention and Control of Deforestation and Burning of the Cerrado (PPCerrado), the Ten-Year Plan for Energy Expansion (PDE) and the Plan of Low Carbon Agriculture (ABC Plan).
3.3 Regulations, laws and resolutions

The Brazilian legal framework on EE is vast and establishes responsibilities for key government agencies, defines stable sources of funds and determines mandatory and voluntary measures. However some key aspects still need improvement.

At present there is an interesting context, both by the dynamics of the energy sector, as the institutional changes, setting up a range of opportunities for the rational use of energy to be pursued in an integrated and complementary manner - from primary resources, up to its conversion by the final consumer. Thus, shall be established coordinated and integrated activities of various institutions and organizations that are related to EE considering that:

• Law 9478 of 06/08/97, in Article 1, section IV, states that one of the principles and objectives of the National Energy Policy is to "protect the environment and promote energy conservation";

• should the National Energy Policy Council (CNPE), according to the same law, "promote the rational use of energy resources in the country, in accordance with applicable law", with the technical support of regulatory bodies of energy sector;

• It is up to the National Petroleum Agency (ANP), according to the same law, "promoting the regulation, contracting and supervision of the economic activities of the oil and natural gas industries" and "enforce good practices of conservation and rational use of oil, derivatives and natural gas and preservation of the environment";

• Law 9427 of 26/12/96, in its Article 3 establishes that the National Agency of Electric Energy (ANEEL) has as its mission, among others, as prescribed in Law 8987 of 2/13/95, in Article 29, item X, "stimulate the increase of quality, productivity, environmental preservation and conservation"

• Annex I to Decree 2335 of 06/10/97, in Article 4, paragraphs IX, XX and XXIII, defines as ANEEL competencies, respectively, "encourage combating waste of energy with respect of all forms of production, transmission, distribution, trading and use of electricity "," articulate with other regulators in the energy sector and the federal government on matters of common interest "and" encourage and participate in research and technological development necessary for electricity industry".

3.3.1 EE Law

Important milestone for EE in Brazil was the approval of Law No. 10,295 about the National Policy for Conservation and Rational Use of Energy on October 17, 2001. The law, in its Article 2, provides that the government shall determine "maximum levels of specific energy consumption or minimum EE levels of machines and energy-consuming devices, manufactured and sold in the country." Decree No. 4059 of 19 December 2001, established the Steering Committee of Indicators and Levels of EE - CGIEE with assignments, among others, the development of specific regulations for each appliance energy consumer and the establishment of the Program targets showing the evolution of the levels to be achieved by each regulated equipment.

Technological innovations in the production of more energy efficient equipment can bring benefits that go beyond the energy sector, also reaching other sectors of the economy and society. Thus, by reducing energy consumption in a washing machine, it may result as consequence lower water consumption. These technological innovations also generate benefits for the environment, such as the manufacture of refrigerators efficient CFC-free.

The EE Law determines that the government should establish maximum levels of specific energy
consumption or minimum EE levels for machines and energy-consuming devices, manufactured or sold in
the country, based on relevant technical indicators. For long term purposes the Law is planned to establish a
Target Program to establish the progressive evolution of these levels of efficiency. The effective
implementation of this law was enforced by Decree 4.059/01, creating the CGIEE, coordinated by the
Ministry of Mines and Energy. Also participate of CGIEE representatives of MCTI, MDICT; ANEEL and
ANP, as well as representatives of the Brazilian society and universities.

The CGIEE should prepare work plan and schedule, as well as the specific regulations and plan goals for
each machine or appliance energy consumer. Technical Committees are created to instruct their decisions and
monitor their rulemaking process. The law created several instances to interact with stakeholders:
manufacturers, consumers and civil society organizations, with the convening of public hearings and
consultations with the technical support of INMETRO, PROCEL and CONPET. The goal is to ensure
transparency in the setting of EE indicators.

Law No. 10.295/01 also predicts that the maximum levels of specific energy consumption or minimum EE of
machines and energy-consuming devices, should be established based on values technically and
economically feasible, considering the life cycle of the machines and energy-consuming devices.

CGIEE began its works in July 2002 and so far has developed the following core products:

• Work Plan for Implementation of the Law;
• Specific Rules of Three Phase Electric Motors;
• Specific Rules of Compact Fluorescent Lamps;
• Consultation and Public Hearings for Specific Regulations of the following equipment: refrigerators,
  freezers, air conditioners, stoves and ovens;
• Draft for Specific Regulations for Gas Water Heaters;
• Regulation for Voluntary Labeling of EE Level of Commercial and Public Buildings.

The implementation of the EE will result in:

• Remove less efficient equipment from the market, in the medium and long term;
• Get progressive energy savings over time;
• Promote technological development;
• Promoting increased industrial competitiveness of the country;
• Reduce consumer spending;
• Contribute to the reduction of social and environmental impacts through the use of equipment that consume
  less energy and are environmentally friendly.

3.4 National Policy on Climate Change – Law 12187/2009 and decree 7390/2010

In 2009 was established the National Policy on Climate Change (PNMC), through Law No. 12.187/2009.
The PNMC has the objective of promoting the reduction of emissions of greenhouse gases in Brazil
associated with the promotion of sustainable development based on the use of clean technologies, new
production practices and the development and dissemination of knowledge.

The National Policy on Climate Change formalizes the voluntary commitment of Brazil to UN Framework
Convention on Climate Change to reduce emissions of greenhouse gases between 36.1% and 38.9% of projected emissions by 2020.

According to Decree No. 7,390/2010, which regulates the National Policy on Climate Change, the baseline emissions of greenhouse gases for 2020 was estimated at 3.236 Gt CO2-eq. Thus, the corresponding absolute reduction was established between 1.168 Gt CO2-eq and 1.259 Gt CO2-eq, 36.1% and 38.9% reduction in emissions, respectively.

The PNMC administration is up to the Interministerial Committee on Climate Change (CIM) and its Executive Group (GEx), established by Decree No. 6,263/2007. The instruments for their implementation are, among others: the National Plan on Climate Change, the National Fund on Climate Change and the Communication of Brazil to the UN Framework on Climate Change.

4- Funding Sources and Financing for EE

The current funding of EE programs in Brazil comes from several sources: budget funds from Petrobras and Eletrobras, Global Reversion Reserve (RGR), resources of international funds such as the Global Environmental Facility (GEF), 0.25% of operating revenue income (net sales) of utility companies electric power distributors, Program PEE, bank loans to ESCOs (BNDES, Caixa Economica Federal), and consumers own capital. As noted, most of the funds come from the public sector via compulsory market mechanisms (minimum percentage of investment). There is a market for EE, yet underutilized, coming from the Clean Development Mechanism (CDM).

4.1 Global Reversion Reserve - RGR

The Global Reversion Reserve (RGR) was established in 1957, corresponding to a percentage of assets of concessionaires of public service of electricity, collected for administration by Eletrobras, for system expansion and improvement of service quality. In 1993, through Law No. 8,631, was expanded in order to finance EE projects and rural electrification.

In 2002, Law No. 10,438 RGR is intended for use in the program for universal access to electric energy (Luz para Todos) and for developing projects with alternative energy sources (Wind, Solar and Biomass) and Small Hydropower Plants (PCHs), and for thermoelectric plants and thermonuclear plants.

In 2003, Law No. 10,762 allows the use of RGR in the form of economic subsidy in implementing the program for universal access to electric energy.

In 2004, Law No. 10,848, RGR is intended for use in the program for universal access to electric energy for developing projects with alternative energy sources (Wind, Solar and Biomass) and Small Hydropower Plants (PCHs) as well as thermoelectric plants and thermonuclear power generation.

In 2010, Provisional Measure 517 extended the term of RGR up to the end of 2035.

The average annual revenue of RGR in recent years is in the range of R $ 1,000.00 million. The RGR is an important duty which is funding the expansion of the electricity sector since the 70s, when it became managed by Eletrobras.

However, with the publication of Law No. 12,783, of January 11, 2013 (Conversion of Provisional Measure No. 579 of 2012) which deals with the extension of concessions of electricity generation, in order to obtain a reduction in electricity rates through this extension and reducing or eliminating some tariff charges levied on electricity bills, it created great uncertainty about the future of RGR resources for EE.

This law determines that:

Article 21. Are not bound, as of January 1, 2013, the payment of annual dues of RGR:
I - the concessionaires and licensees of public service of electricity distribution;

II - the public utilities of electricity transmission auctioned from September 12, 2012, and

III - the public utilities of transmission of and electric power generation extended or tendered under this Act.

Article 22. The RGR funds can be transferred to the CDE.

Article 23. Law No 10,438, dated April 26, 2002, becomes effective with the following changes:

I - promoting the universalization of electricity service throughout the national territory; ...

VI - to promote the competitiveness of energy produced from the following sources: wind power, thermo solar, photovoltaic, small hydroelectric plants, biomass, other renewable and natural gas.

This leaves uncertain the future of these resources until authorities of the Federal Government publish new guidelines.

4.2 Law No. 9991 of 24/07/2000.

This Law determines the application of amounts of 0.5% up to 2015 and 0.25% as of 2016, of net operating income - net sales - of the electricity distribution utilities in EE projects aimed at final use. This law also establishes the minimum percentage for investment in research and development of the electric sector (including EE) by the utilities generation, transmission and distribution. These funds are invested in programs directly by the companies themselves or through the National Fund for Scientific and Technological Development - FNDCT, plus the portion allocated to MME studies and research for planning the expansion of energy system, as well as studies of inventory and feasibility necessary for exploitation of hydroelectric potential.

• The aim is to demonstrate the importance and viability of actions to combat the waste of electricity, and improve EE of equipment, processes and end uses of energy, stimulating the transformation of the electricity market, and the development of new technologies and creating habits of rational use of electricity.

• On January 20, 2010, Law No. 12,212 was amended, stating that up to December 31, 2015, the minimum percentage is 0.50% for both research and development and for EE programs in supply and end-use energy.

• Law No. 12.212/2010 also determined that the concessionaires and licensees of distribution of electricity should apply at least 60% (sixty percent) of its resources in efficiency programs for consumer units benefited by the Social Tariff.

4.3 Sectorial Funds

• On July 31, 1969, by Decree-Law no. 719, was created the National Fund for Scientific and Technological Development - FNDCT to give financial support to priority programs and projects for scientific and technological development. Its constitution was designed in a flexible manner and can receive budget funds, from tax incentives, loans from financial institutions or other entities, contributions and donations from public and private entities and funds from other sources. The Financier of Studies and Projects - FINEP, established in 1967, is the Executive Secretary of FNDCT.

• Other sectorial funds have been created since 1998, with the purpose of funding research projects, development and innovation in Brazil and to contribute to national growth in science, technology and innovation.

• Some of these are relevant Funds for the Energy Sector. Among the existing Sectorial Funds, those most directly related to the topic are the Energy Sector Fund (CT-Energ), the Water Resources Fund (CT Hidro),
the Mineral Fund (Mineral-CT) and the Petroleum and Natural Gas Fund (Petro CT). This mechanism aims to attend to the development of their respective industries, and can be used to promote the development of technologies to improve EE, such as, for example, the CT-Energ.

• Created by Law No. 9991 of June 24, 2000 and regulated by Decree 3867 of July 16, 2001, the CT-Energ has as its fundamental objective to finance scientific research and technological development in electricity sector as well as projects that seek to increase the efficiency in energy end-use.

4.4 PROESCO

On May 19, 2006, BNDES approved PROESCO; program intended to finance EE projects. The program aims to support the implementation of projects that contribute to energy savings, with action focuses on lighting, motors, process optimization, compressed air, pumping, air-conditioning and ventilation, refrigeration and cooling, steam production and distribution, heating, automation and control, power distribution and energy management. The funding also includes end users of energy, interested in financing the purchase of efficient equipment. Performed in the same patterns and in line with environmental protection projects, PROESCO opens a credit line of R $ 100 million to fund up to 80% of the total value of the projects. PROESCO funds: studies and projects, works and installations, machinery and equipment, specialized technical services, information systems, monitoring, controlling and surveillance.

It is worth mentioning lines of credit that can be offered to consumers of energy such as the BNDES FINAME, and BNDES FINEM. The BNDES FINAME is a line of credit for financing production and acquisition of new machinery and equipment made in Brazil. The BNDES FINEM is a line of credit for financing the projects worth more than $ 10 million, held by BNDES directly or through Accredited Financial Institutions.

4.4.1 ESCOs market

The Brazilian market for ESCOs has evolved very slowly mainly due to some market failure that are summarized below. The market is organized around ABESCO - Enterprises Association of Energy Conservation Services was founded in 1997 and aims to officially represent the energy efficiency companies segment, encouraging and promoting activities and projects for the growth of the energy market. ABESCO currently has 84 members within a market estimated at about 100 companies. Most ESCOs are businesses created from owners’ capital and are relatively young, up to 10 years of foundation. Most of these companies operate nationwide

Most ESCOs are dedicated to projects in the following areas:

Electricity
Rates Revision
Thermal Energy
Solar Energy
Wind Energy
Water and effluent treatment

Most of these companies are dedicated to EE projects in electricity as the main area. Within this field we can relate the following activities:

Lighting

54
Compressed air
Diagnostics
Demand Management
Power Factor Correction
Tariff Review
Substitution of Equipment
Demand Control
Motors and drive systems
Sectoral Measurements by type of process
Correction of electrical installations
Power Quality
Replacing equipment

The major problems faced by ESCOs in the Brazilian market are lack of funding, mostly related to the lack of performance contract, and the ignorance and/or entrepreneurial demotivation regarding EE.

Most customers of ESCOs belong to the industrial or service sectors, and there is also a significant market share corresponding to the commercial sector. Very few ESCOs operate or have customers in the areas of oil and gas.

In Brazil there are virtually no ESCOs working with strict or "pure" concept of Performance Contract, ie, that in which ESCO offers customers a full energy efficiency service, which includes the financial resources needed to implement the technology solution verified and remunerates along time depending on the results achieved. Abroad this type of solution is more common and ESCO receives part of the total energy saved through M & V methodology and under conditions stated in the contract, without any initial disbursement client. There are often partnerships between investors and ESCOs in "Pure" Performance Contracts. Abroad the great bulk of ESCOs works are linked to the public sector.

In Brazil, ESCOs work with their own resources or clients resources. There is a funding source from BNDES - Proesco, which was created in order to encourage energy efficiency projects performed by ESCOs. However, the conditions, primarily demand for guarantees, and bureaucracy inherent to the process, represent barriers to operations. Another point that inhibits the action of ESCOs in Brazil is the fact that they have immense difficulties to work in the public sector through contract performance, since in the budget of public institutions, energy expenditure is linked to current expenditures, while contracting ESCOs (or contracting in general), as well as deployments of technology solutions are linked to investment. Thus, the reduction of energy costs cannot be used to pay for the investments made according to a cash flow project. Some PPP models have been implemented as a means to minimize barriers within the public sector, but without a standard to be followed. Finally, the PEE of ANEEL also has no effective mechanism to support ESCOs, although they participate in the program.

In this context, the aspects listed above constitute the main constraints to ESCO service in Brazil.

4.5 National Fund on Climate Change - FUNDO CLIMA

The National Fund on Climate Change, created through Law 12.114/2009, aims to provide the
financial resources to implement the Policy and Plan on Climate Change. This Fund provides that a portion of the funds from exploration and production of oil should be used in order to avoid or minimize environmental damage caused by these activities, especially those associated with the use of this natural resource as an energy source that contributes to the generation of greenhouse gases and consequent global warming.

This phenomenon has on burning fossil fuels the main source of global emissions of greenhouse gases. Although Brazil presents a differentiated scenario, with emissions from burning fossil fuels contributing with a smaller portion compared with the change in land use and forests, one must recognize its relevance to the total national emissions.

Thus, part of the resources needed for the effective implementation of the Policy and Plan will come from the profits arising from the exploration and production of oil. It is important to emphasize once again the uniqueness of this Brazilian action in an attempt to avoid or minimize climate change.

The funds may be used in different ways: repayable loan granting, through the financial agent, or non-reimbursable projects or studies focusing on mitigation of climate change and adapting to climate change and its effects chosen according to the guidelines issued by the Management Committee of FNMC.

The source of funds will be from different sources: up to 60% of the resources referred to in Part II of § 2 of art. 50 of Law 9478 of August 6, 1997; appropriations contained in Union Annual Budget Law and additional credits; resources form agreements, adjustments, contracts and covenants concluded with entities of the federal, state, district or municipal public administration, donations made by national and international, public or private entities, loans from national and international financial institutions, diverse resources provided by law; reversal of the annual balances not applied; funds from interest rates and amortization of financing.

The Fund aims to support projects or studies and finance projects aimed at climate change mitigation and adaptation to climate change and its effects. It is aimed, preferably to the development of environmental management activities related to the oil production chain.

We highlight the following points of the law that created the National Fund on Climate Change (Law 12.114, December 9, 2009): Purpose (article 2): "Ensure resources to support projects or studies and finance projects aimed at climate change mitigation and adaptation to climate change and its effects".

Priorities:
Not Reimbursable resources:
• Activities for mitigation and adaptation, especially to meeting the most vulnerable sectors of society.

Reimbursable resources:
• Mitigation actions related primarily to sectoral plans.
• Actions of adaptation that have potential financial returns and public sector investments.

Applications of funds
1. Resources Not Reimbursable Direct operation by MMA
   1st Year: application of R$ 30 million
2. Reimbursable Resources Operated via BNDES (contract with MMA)
Budget 2011: R$ 200 million
Additional Resources => contributed annually
2012 => budget: + 360 million
Applications Reimbursable BNDES:
In 2011 => 6 lines of action (Annual Plan Application Resources) subprograms:
1. Modals Transportation Efficient
2. Efficient Machinery and Equipment
3. Renewable Energy
4. Harnessing Energy from Waste
5. Vegetable Charcoal
6. To Combat Desertification

Expected Results:

Have encouraged significant investment for the country to:
1. Achieving the targets of emission reductions of greenhouse gases - set out in the National Policy on Climate Change;
2. Reduce vulnerability to the adverse effects of climate change, and
3. Prepare to compete in an economy of low carbon.

Perspectives:
- The limit for raising the Climate Fund, only because of the special participation, is now approximately R$ 750 million per year.

4.5.1 Fundo Clima Management

The Executive Secretary of the Climate Fund is a management linked to the Department of Climate Change - DEMC of the Secretariat of Climate Change and Environmental Quality - SMCQ, with the assignment to perform the function of administrative and operational support to carry out the instruction, celebration and other procedures that have as their object the execution of projects supported by the Fund.

The Management Climate Fund is organized to meet the three priority themes, namely: the feasibility of contracting projects, the necessary monitoring of the implementation of the projects and their associated monitoring results and support the activities of the Steering Committee.

The Fund is managed by a Steering Committee chaired by the Executive Secretary of the MMA. The Committee must approve the proposed budget and Annual Plan for Resource Investment of the Fund, the PAAR. At the end of each year, must report on the application of funds. The joint committee also has the authority to establish policies and investment priorities for periods of two years. Finally, the Steering Committee has the task of authorizing the financing of projects and to recommend the contracting of studies.

5- EE and Climate Change integration, cooperation and joint actions

Despite all the indications and mutual references written into their legislation, plans and programs of the sectors of EE and climate change, there is no formal joint action of the two sectors formalized between the sectors.
However, several initiatives have occurred in an isolated manner. Such initiatives not only really show the affinity between the two sectors, but also indicate a great potential for mutual cooperation. They also show that the sectors think globally, and always with a mutual concern.

It is worth mentioning here some of these actions.

### 5.1 Labeling sector

PBE in partnership with PROCEL, develops labeling programs in the area of renewable energy with the aim of encouraging the use of these sources. Labeling a product of this area not only indicates its efficiency but also shows to the market of this type of product a clear indication that it is a reliable product. This has prevented low quality products to the consumer to pass a negative image of this technology.

A case that has shown excellent results is the sector of solar water heating. After the beginning of labeling occurred a total transformation of the market with market exit of companies that were not complying with new standards and have been clearly put away by consumers and with remarkable efficiency gains among manufacturers remaining in the market.

Two other examples are the labeling of photovoltaic systems and small wind turbines. Both products were not labeled classically, but considering that the market for these products was in serious danger due to the presence of very low quality products, it was decided for its labeling with very encouraging results. These actions meet one of the goals of the National Plan on Climate Change which is: “Maintain the high share of renewable energy in the electricity matrix, preserving the outstanding position Brazil has always occupied in the international scene”.

Another example of global vision, demonstrating environmental concern is the labeling of washing machines. The label rates this product according to 4 criteria: energy consumption, washing performance, efficiency centrifugation (extraction of water), and water consumption. This allows the consumer to consider in his decision of purchase, beyond EE, a factor of great importance in an environmental standpoint that is water consumption.

To get PROCEL Seal the washing machine must be rated A in the first 3 requirements and have low water consumption.

The most significant action PROCEL focused on environment is the labeling of refrigerators. PROCEL imposed to refrigerators, as a condition for receiving the Seal, that they should employ in their expanded foam used in thermal insulation, non-aggressive gases to the environment, i.e., they do not attack the ozone layer or contribute to warming global of the planet.

Below we reproduce the criteria contained in the document Criteria for Granting the PROCEL Seal for Energy Saving to refrigerators and similar products - (supplementary document to the Rules for Granting the PROCEL Seal for Energy Saving) - 25/08/2010:

"The manufacturer / importer who wish to make use of PROCEL Seal on model of its manufacturing line (or on an imported model) shall demonstrate, through tests prescribed in" RAC Refrigerators and Similar ", in force, that the model meets:

- Electrical safety requirements;

- At the minimal of efficiency level corresponding to the range classification "A" of the respective ENCE, and

- If the product use expanded foam to provide its thermal insulation, the expander gas used must meet the following characteristics:
- present-ODP (Ozone Depletion Potential) equal to 0.

- present-GWP (Global Warming Potential) equal to or less than 300.

Note: The values of ODP and GWP will be effective from 01/01/2012."

To establish these parameters of ODP and GWP was performed a joint action of PROCEL with the Coordination of Protection of the Ozone Layer of the Secretariat of Environmental Quality and Climate Change of MMA. This action allowed PROCEL to be properly advised and guided in determining the appropriate parameters and was able to dialogue with manufacturers with complete mastery of the topic.

5.2 PEE programs

Another action of EE sector with great concern for their environmental impacts was the various programs implemented under the PEE by utilities for the exchange of refrigerators of low-income consumers. It was established as a condition the reverse logistic, in which to carry out these programs the old refrigerators received in exchange for new ones are dismantled by specialized companies seeking the perfect collection of compressors gases and insulating foams so that there is no leakage to the environment. Compressor oils should also be carefully collected. Such determination prevented the improper disposal of polluting materials of thousands of dismantled refrigerators. According to ANEEL from 2008 to 2012 have been exchanged 630,000 refrigerators.⁴

5.3 Buildings Labeling

An important action of EE sector also establishing environmental criteria is the labeling of buildings. Besides all the classic considerations relating to EE, the Technical Regulations on Quality Level for EE of PBE - Edifica also adopts criteria for use of renewable energies, such as use of solar water heating, power generation by wind systems and/or photovoltaic systems, natural ventilation and lighting. It also adopts criteria for environmental preservation as the rational use of water, individual metering of water consumption, rainwater harvesting and greywater reuse.

5.4 Transport

The transport sector is the 2nd largest energy consumer in the country with about 30% of the total final consumption in 2011. Consumption is basically concentrated in petroleum and ethanol. These two sources together account for 98.4% of total energy consumption in the transportation sector. The diesel stands out as the largest energy consumption reaching 48.6% of total consumption in 2011 (35,929 toe). Of this total, 96.3% is allocated to road transport.

We list below a table with a summary of the major energy consumption in the transportation sector in 2011:

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⁴ Source: www.aneel.gov.br
Table 5.4
Consumption of main sources in the transport sector in 2011 (10³ toe)

<table>
<thead>
<tr>
<th>Source (10³ toe)</th>
<th>TOTAL</th>
<th>Highways</th>
<th>Railroads</th>
<th>Airways</th>
<th>Waterways</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>10³ toe</td>
<td>%</td>
<td>10³ toe</td>
<td>%</td>
</tr>
<tr>
<td>Diesel</td>
<td>48.6</td>
<td>35,929</td>
<td>50.9</td>
<td>34,588</td>
<td>87.3</td>
</tr>
<tr>
<td>Gasoline automiles</td>
<td>28.2</td>
<td>20,838</td>
<td>30.7</td>
<td>20,838</td>
<td>-</td>
</tr>
<tr>
<td>Gasoline aerial</td>
<td>0.07</td>
<td>54</td>
<td>-</td>
<td>-</td>
<td>1.5</td>
</tr>
<tr>
<td>Electricity</td>
<td>0.002</td>
<td>146</td>
<td>-</td>
<td>-</td>
<td>12.7</td>
</tr>
<tr>
<td>Ethanol</td>
<td>14.5</td>
<td>10,735</td>
<td>15.8</td>
<td>10,734</td>
<td>-</td>
</tr>
<tr>
<td>Kerosene</td>
<td>4.8</td>
<td>3,569</td>
<td>-</td>
<td>-</td>
<td>98.5</td>
</tr>
<tr>
<td>Natural gas</td>
<td>2.34</td>
<td>1,735</td>
<td>2.6</td>
<td>1,735</td>
<td>-</td>
</tr>
<tr>
<td>Fuel oil</td>
<td>1.3</td>
<td>983</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Others</td>
<td>0.02</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>73,989</td>
<td>100</td>
<td>67,896</td>
<td>100</td>
</tr>
</tbody>
</table>

The transportation sector is divided in cargo transportation and passenger transportation. Each one having specific needs and critical issues that directly affect its energy efficiency.

The passenger transportation sector is characterized by an extremely low efficiency. In urban areas, despite the large urban concentrations, there are few mass transportation systems in operation, with a predominance of buses and minibuses.

In the sector of intercity transport of medium and long distances also dominates the road transportation followed by air transportation. The first is saturated and dependent on a road network saturated and often in precarious conditions. The second finds also serious infrastructure problems that cannot meet a demand with high growth rates.

This scenario can stimulate the emergence of new opportunities. Projects are under studies for subways and rapid transit corridors in several cities. Are also under study, or in bidding phase, high-speed rail connections between major cities. However, many of these initiatives become frustrated due to uncertainties regarding the demand associated with a higher level of prices and the lack of regulatory framework for long-term return enterprises.

In the cargo transport sector the country has a matrix with a strong predominance of road transport accounting for about 60% of the total.⁶.

Few initiatives for EE are really concrete in the transportation sector. As we saw earlier the CONPET keeps some assistance programs for truckers and fleets and also programs in education. As we will see, the program with the greatest impact is the labeling of vehicles, but that still does not cover all vehicles, especially cargo.

According to PNEf, efficiency from road transport compared to other transport systems is very low. The fuel consumption for transporting 1,000 tons of cargo per km is 5 liters in waterways, railways in 10 liters, 96 liters and on highways. And compared to U.S. indexes these figures would be even lower in the event reaching the on road transportation 15 liters.

⁵ Source: National Energetic Balance 2011- BEN, EPE
⁶ Fonte: PNEf
Furthermore, the average age of the fleet is very high, with 44% of the trucks with more than 20 years and 20% over 30 years of use.

Also according to the PNEf, to achieve satisfactory levels of EE the transport sector needs to face the following challenges:

- Overcoming limitations of transport infrastructure;
- Expand the geographic coverage of transport infrastructure;
- Ensure that the transport infrastructure is inducing factor and catalyst for development;
- Reduce the predominance of road transport in the transport matrix, through the intensive and adequate use of the modalities railway and waterway, taking advantage of its greater productivity and energy/environmental efficiency.

This of course will require a multidisciplinary effort involving various ministries and government agencies.

The PNEf, proposes diverse lines of action to achieve these goals. The most relevant are:

- Support the National Transport Policy, based on the National Plan for Logistics and Transportation - PNLT, which proposes to change the matrix of cargo transport, with priority for rail and water transport;
- Supporting the National Policy for Transportation and activities for the implementation and retrofiting projects for mass transportation in major cities, renewing the fleet of trucks and buses vehicle inspection programs, improvement of fuel quality, research on biofuels of 2nd and 3rd generations, driver training for economical driving;
- Broaden the scope of the vehicles labeling program for the greatest number of types and models of light vehicles, developing methodologies for the labeling of heavy vehicles;
- Promoting technological development to improve vehicle engines, including options for hybrid and electric engines;
- Reduction of taxes on vehicles more energy efficient and / or with lower emission levels of pollutants;
- Promoting EE through policies encouraging waterway, rail and pipelines transport and promote actions for EE in these sectors;
- Promoting the use of electric vehicles, with tax cuts and subsidies, and also evaluate the issue concerning the regulation in the electric sector;
- Encourage drivers education aimed at economic driving through driving techniques aimed at reducing fuel consumption.

### 5.4.1 Vehicles Labeling

In the field of vehicular labeling a technical approximation is being discussed between INMETRO and PROCONVE. PROCONVE (cars) and PROMOT (motorcycles), Programs of Control of Air Pollution by Motor Vehicles was created in 1986 by the National Environment Council - CONAMA. Its objectives are to reduce and control air pollution by mobile sources (motor vehicles), setting time limits, maximum emission limits and establishing technological requirements for domestic and imported automobiles. Compliance with these requirements is assessed through standardized testing in dynamometer and with "reference fuels".

This rapprochement between the two programs aims to unify efforts. This unification considers that the test methodologies are very similar and use the same laboratory for their tests. As result will be initially informed a unique value of CO$_2$ emissions and in the next step all the information about the tests of PROCONVE will be indicated on the label.

For this purpose was published Joint Ordinance IBAMA / INMETRO No. 2, December 16, 2010, establishing the unique classification resulting from the union of environmental indicators that compose the Green Note of the Brazilian Institute of Environment and Renewable Natural Resources-IBAMA, methodology for classification of vehicles in relation to levels of emissions, arising of Air Pollution Control Program by Motor Vehicles-PROCONVE, with EE indicators of the Brazilian Vehicular Labeling Program - PBEV, of INMETRO. This Ordinance states that:
- The emission of pollutants pass to be released also on the National Label of Energy Conservation-ENCE of PBEV under the title Energy and Environment;

- The amount of CO$_2$ (Carbon Dioxide) disclosed on the label will be declared by the manufacturer or importer of the vehicle to the PBEV.

**5.4.2 Future trends in transports emissions**

The future level of carbon dioxide emissions in the transportation sector will largely depend of whether users will continue to increase the weight and power of the vehicles they drive, as well as the distances they travel. Work is required between the government together with automotive companies to develop a new generation of vehicles that are more efficient than the current, without any loss of security, comfort, and cost. Furthermore, it is important to develop engines and advanced fuels, cleaner and more efficient, which can be used both in trucks and in the utilities, which are becoming increasingly popular.

**5.5 Solar Strategic Plan**

The Solar Strategic Plan is an initiative of the Solar Energy Technical Group, coordinated by MMA and with the participation of various entities. The plan establishes priority lines of action to achieve a goal of 15 million m$^2$ of collectors for solar heating systems (SHS) installed in the country by 2015.

This Plan meets one of the objectives of the PNMC that is “Maintain the high share of renewable energy in the electricity matrix, preserving the outstanding position Brazil has always occupied in the international scene”. Its general purpose is to organize the actions of different entities, aiming at increasing the participation of solar thermal energy source. It was divided into five lines of action:

1 - Public Policy;

1 a) Program My House My Life (Minha Casa Minha Vida) : for the construction of residences for low-income families, in this case the Plan seeks to insert the SHS program. For single-family houses SHS will be mandatory, and in the others constructions, viability should be analyzed. It is estimated up to 260 thousand homes equipped with SHS.

1 b) promotion of legal instruments (Solar Cities). Aims to work with local governments to create laws favoring the installation of SHS, disseminate successful cases, and include the SHS in public works.

1 c) propose new lines of funding and financing for residential, commercial and small businesses, including market mechanisms aimed at reducing greenhouse gases.

2 - Training;

2 a) Awareness rising of decision-makers, such as: financial agents, architects and designers, managers and technicians of the construction industry, to disseminate SHS sustainably.

2 b) Green Jobs: intends to develop a training program for formation of skilled manpower.

2 c) Training of end users: so that they know the operation and maintenance of SHS. It will be produced educational material to disseminate information on the subject.

2 d) Training SHS: aimed at educating future architects and engineers through the inclusion of the subject in their respective courses.

2 e) Educational materials for capacity building and training programs will be developed, including standards
and legislation, best practice design and installation of SHS, and also considering regional characteristics.

3 - Innovation and technological development;

3 a) Life Cycle SHS: The aim is to create a database on the main materials, costs, performance and manufacturing process, to make the analysis of its life cycle.

3 b) Creation of industrial poles: for the production of materials and equipment.

3 c) New materials, technologies and processes for production of SHS: to promote the design and manufacture of new solar collectors for different applications with compatible costs.

3 d) SHS in the industrial and commercial uses: there will be a study of industrial processes for low and medium temperatures, to encourage the use of solar technology.

4 - Management of information and marketing;

4 a) Information Campaign and Marketing: Plan will create the National Marketing on the use of solar thermal energy in order to adopt an adequate language to meet the whole society.

4 b) Site for Knowledge and Technology Management: to manage information through communication tools and collaborative work.

5 - Creation of the Brazilian Platform for Solar Thermal Energy: This network aims to follow up the Plan and its results, proposing corrective actions when necessary.

6- Concluding Remarks

Brazil is currently facing a scenario extremely favorable for strengthening the EE market with great potential to be explored. But in practice, this market and this potential does not seem to be materializing. Considering the achievements and the achievements of the national EE programs, the existence of a policy and the implementation of PNEf will provide advances in the mobilization and in the actions of several agents to overcome the existing barriers. The detailing of the National Policy of EE and the planning of the actions and of the operational structure will consolidate the policy established by PNEf.

To increase EE programs results depends on the consolidation of operational strategies that are producing good results and the creation of new strategies so that these programs can be considered as alternatives to options for expanding the supply of energy in planning expansion of the energy sector.

The design of EE projects as options to expand the supply of energy will only be feasible with the adoption of reliable procedures for monitoring and verification (M & V) of the results of these projects. As a result of a number of EE strategies, a virtual power plant can replace the implementation of a generation enterprise.

So the major challenge of the moment is to make the market and business activities of EE sustainable. This sustainability is an essential condition so that actions of EE may also be considered in the planning of other sectors such as Climate Change.

From the standpoint of actions, joint or integrated with the sector of Climate Change some points of EE policies should be approached with special attention, as discussed below.

6.1 Improve the legal framework in order to stimulate the market of EE

Brazil has currently a vast legal and regulatory framework, whose scope covers the PBE, PROCEL, CONPET, PEE, and EE Act, among others. New operational strategies will require the expansion of this legal basis. New operational strategies will require the expansion of this legal basis. As examples, we can
mention: changes in tariff regulation of the distribution utilities of electricity and gas, allowing making 
profits with EE programs, and regular and more intensive use of tax incentives for more efficient equipments 
and processes.

6.2 To institutionalize and to intensify the adoption of criteria of environmental 
protection for PROCEL Seal and CONPET Seal

Considering the good results presented by the actions already carried out under the PROCEL Seal, as seen 
previously, it is clear that these actions must take an institutional character with a formal participation of 
MMA's Climate Change Sector in the Seal Program. There are many opportunities to include not only new 
criteria for the equipment already encompassed as well as for new equipment. We may mention as examples, 
among other actions:

- Limit mercury content in CFLs and sodium vapor lamps, which are already part of the Seal and all other 
discharge lamps that might receive the Seal.

- Impose limits for ODP and GWP, also for refrigerant gases in refrigerators, freezers and air conditioners 
and insulating materials of thermal reservoirs of solar water heating.

- Require manufacturers to have programs of reverse logistics for all products.

Likewise Seal CONPET might adopt similar measures for products of its coverage area, especially with 
regard to the labeling of vehicles.

6.3 Facilitate accessing permanent funding sources

After the publication of Law No. 12,783, of January 11, 2013 (Conversion of Provisional Measure No. 579 
of 2012), which created great uncertainty about the future of RGR resources for EE, it is very important to 
create new financing sources for EE or to redirect some existing sources. As PROCEL and CONPET are 
coordinated and supported by Eletrobras and Petrobras, this law may also affect those programs. Considering 
the Federal Government policy of reducing energy costs and also the fact that those companies are now 
aimed to provide profits to its private shareholders, they are under threat of suffering cuts to their budgets 
and their staff.

On the other hand there is a market worldwide, yet underutilized, for EE, coming from CDM. Currently, 
there are very few projects directly specified as being for EE. This option can be an alternative for financing 
EE projects. However it is necessary that interested parties can rely on a advisory services so that they can 
properly fit the project requirements to obtain these funds. Many entrepreneurs, especially the smaller, give 
up obtaining these resources when faced with these requirements.

It would be important to facilitate access by EE programs to some funds from the environmental sector. This 
will depend on the nature of the funds and also the rules for resources application.

6.4 Tax breaks and tax reduction Policies

Tax incentives, easy credit, and reducing taxes and fees for the purchase of efficient vehicles and equipment 
has been another tool utilized in many countries, but still not widely used in Brazil. The government has 
sporadically employed tax cuts for efficient products as a result of actions to increase sales of industry in 
time of crisis or in situations of shortage of power supply, as in 2001. These actions are not seen as 
permanent and institutionalized instruments. This mechanism needs to be further worked together with the 
various government sectors. It is important that these sectors become aware that these benefits shall revert in 
gains for society and for the economy, due to increased sales and consequent increases in the number of jobs 
and tax revenues, and thus not a mere tax waiver applied in times of crisis.

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6.5 Industrial Policy

EE plays an important role in the issue of quality and productivity of industries in general. Energy conservation programs can also substantially improve the competitiveness of energy-intensive industries in the global market. In this case the reduction of energy consumption may generate not only financial gain, but also considerable gains on reducing the environmental impacts of these industries. The inclusion of EE as a basic principle of government industrial policy formulation should be worked out jointly with other government actors.

The Climate Change Sector may eventually contribute to actions in this direction.

6.6 Final Comments

In conclusion, the importance of joining efforts between sectors of EE and Climate Change is clear. The successes of joint actions already performed presented in this report, clearly show the total affinity between the two sectors and the potential gains to be shared by both. It is important to create mechanisms and formal channels for joint action with fixed partners and patterns of work planned together.


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8 - Abbreviations and acronyms

ABINEN - Brazilian Association of Electrical and Electronics Industry
ADENE - Energy Agency of Portugal
ANEEL – National Agency of Electrical Energy
ANFAVEA – National Association of Motor Vehicles Manufacturers
ANP - National Agency of Petroleum, Natural Gas and Biofuels
BEN - National Energy Balance
BNDES - National Bank for Economic and Social Development
CDE – Energy Development Account
CDM - Clean Development Mechanism
CFC - Chlorofluorocarbons
CFL –Compact fluorescent lamp
CGIIEE - Steering Committee of Indicators and Levels of Energy Efficiency
CICE - Internal Commission for Energy Conservation
CIM - Interministerial Committee on Climate Change
CIMGC - Interministerial Commission on Global Climate Change
CMADS- Commission for the Environment and Sustainable Development, at the House of Representatives
CNP - National Petroleum Council
CNPE - National Energy Policy Council
CNPq- National Council for Scientific and Technological Development
CONAMA - National Environment Council
CONPET - National Program for the Rational Use of Oil and Natural Gas
CONPET Seal – CONPET Energy Saving Seal
Coppe –Coordination of Post Graduation Courses of Engineering
CT Hidro - Water Resources Fund
CT-Energ - Energy Sector Fund
DEMC - Department of Climate Change
DEPPT - Department of Policies and Theme Programs
DNDE - Department of Energy Development
EE – Energy Efficiency
Eletrobras – Centrais Elétricas Brasileiras S.A.
Embrapa – Brazilian Company of Agricultural Research
ENCE - National Energy Conservation Label
EPE - Energy Research Company
ESCO - Energy Saving Company
FBMC - Brazilian Forum of Climate Change
FINEP - Financier of Studies and Projects
FNDCT - National Fund for Scientific and Technological Development
FNMC - National Fund on Climate Change
FUNDO CLIMA - National Fund on Climate Change
GEF - Global Environmental Facility
GEx - Executive Group on Climate Change
GWP - Global Warming Potential
HCFCs - Hydro chlorofluorocarbons
IBAMA - Brazilian Institute of Environment and Renewable Natural Resources
IDEC - Brazilian Institute of Consumer Protection
INMETRO – National Institute for Metrology, Standards and Industrial Quality
INPE-National Institute for Space Research
IPCC - Intergovernmental Panel on Climate Change
LOA - Annual Budget Law
M & V - Measurement and Verification
MCTI - Ministry of Science, Technology and Innovation
MDICT - Ministry of Development, Industry and Foreign Trade
MEN - National Energy Matrix
MIC - Ministry of Industry and Trade
Mineral-CT - Mineral Fund
Minha Casa Minha Vida - Program My House My Life
MMA - Ministry of Environment
MME – Ministry of Mines and Energy
ODP - Ozone Depletion Potential
OIA - Accredited Inspection Bodies
PAAR - Application Resources Annual Plan
PAS - Sustainable Amazon Plan
PBE - Brazilian Labeling Program
PBE Edifica – National Labeling Program for Buildings
PBEV - Brazilian Vehicular Labeling Program
PBMC - Brazilian Panel on Climate Change
PDE - Ten-Year Plan for Energy Expansion
PDE 2007/2016 - Decennial Plan of Energy Expansion
PDEE - Ten Year Plan for Electricity
PEE - Energy Efficiency Program
Petroleo e Mineracao - Petróleo Brasileiro S.A.
Plano ABC - Plan of Low Carbon Agriculture
PME - Energy Mobilization Program
PNE 2030 - National Energy Plan 2030
PNEF - National Plan for Energy Efficiency
PNLT - National Plan for Logistics and Transportation
PNMC - National Plan on Climate Change
PPA 2012-2015-Multiyear Plan
PPCDAM - Plan for Prevention and Control of Deforestation in the Legal Amazon
PPCerrado - Action Plan for Prevention and Control of Deforestation and Burning of the Cerrado
PPCS - National Plan for Sustainable Production and Consumption
PPP – Private Public Partnership
PROALCOOL - National Alcohol Program
PROCEL - National Program for Electrical Energy Conservation
PROCEL Edifica (Buildings Program)
PROCEL Seal - PROCEL Energy Saving Seal
PROCONVE - Program of Air Pollution Control by Motor Vehicles
ProCopa Tourism - BNDES Program of Hotel Energy Efficiency for the World Cup 2014
ProCopa Tourism Sustainable Hotel - BNDES Program of Tourism for the World Cup 2014
PROMOT - Programs of Control of Air Pollution by Motor Vehicles (motorcycles)
R & D – Research and Development
R3E - Network for Energy Efficiency in Buildings
RAC - Regulation of Conformity Assessment
REDD - Reducing Emissions from Deforestation and Forest Degradation
Rede CLIMA - Brazilian Network for Climate Change Research
RGR - Global Reversion Reserve
RTQ - Technical Regulation on Quality Level for Energy Efficiency
SEPED - Secretariat of Policies and of Research and Development Programs

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SHS - Solar Heating Systems
SIN - National Interconnected System
SMCQ - Secretariat of Climate Change and Environmental Quality
SPDE - Energy Planning and Development Secretary
UNFCCC - United Nations Framework Convention on Climate Change