CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	•The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. •As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at<http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	•The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

Demand side energy efficiency program by COELBA for low-income residential customers in Salvador, Bahia.
Version: 04 (09/05/2007)

A.2. Description of the small-scale project activity:

Purpose of the project activity
The main purpose of the project is to carry out energy efficiency measures at the demand side or at the consumption points in low income[1] residential communities around the neighbourhoods of City of Salvador, on State of Bahia, so as to reduce the electricity consumption.

COELBA will assist low-income households to increase energy efficiency through the implementation of a demand-side intervention program capable of reducing demand and increasing resources necessary to meet energy costs. The interventions will combine energy efficiency education, energy demand services and energy payments to achieve the following goals:

1. Reducing the demand for energy usage through replacing appliances with new, more energy efficient products to achieve energy consumption that is affordable for the household;

2. Increasing the ability of the household to meet energy expenses through home improvement measures that will have long-standing impact;

3. Increasing the regularity of home energy bill payments;

4. Push market of adequate energy efficient appliances for low income residents.

This will result in saving electrical energy across 40 districts of Salvador. As consumption of energy is reduced, it will lead to a displacement of a proportional consumption of fossil fuel in Brazilian Northeast electricity supply grid, thus reducing the greenhouse gas emissions.

The COELBA – Electricity Company from State of Bahia is a Brazilian concessionary of public service for distribution of electric energy, located at City of Salvador, Bahia. This energy efficiency project carried out by COELBA is voluntary.

The measures adopted under the energy efficiency program can be defined as a replacement of less efficient devices such as energy-inefficient refrigerators and incandescent light bulbs with new and more energy efficient ones in low-income residential units over the lifetime of the program, as following described:

[1] Low income residential communities may be defined as places where the per capita familiar revenue is insufficient for fulfilling the basic needs of a family (such as home, feed and clothing).

- Replacement of 17,094 refrigerators for new ones with the PROCEL certification (a guarantee of energy efficiency given by INMETRO, a national entity, for products that achieve maximum grade on quality and efficiency tests in the drafted residences). The old devices will be collected, safely handled and scrapped.

- Replacement of 154,464 incandescent light bulbs for efficient 15W and 20W compact fluorescent lamps (for *ex-ante* emission reduction calculation it will be considered only the bulbs with 15W), with PROCEL certification. New lamps will be donated in return to incandescent lamps delivered by consumers and made useless for re-use.

For carrying out these measures, it will be invested around US$ 9.4 million over the lifetime of the program and the total energy saving will achieve around 19.4GWh per year.

How the proposed project activity reduces greenhouse gas emissions

Although industries have increased the energy efficiency standards of new refrigerators models over the past decade, a large share of the refrigerators fleet from low-income housings in Salvador, Bahia, is still composed of old and inefficient models (**Figure 1**). Owners and renters of low-income housing units have little incentive to replace older and energy inefficient appliances such as refrigerators and incandescent light bulbs by new and more efficient ones because most of them have insufficient revenues even for fulfilling the basic needs of their family, so that they would not be able to support any change in a short term or even long term. The investments for the consumers for saving energy by this way are too high and, consequently, unaffordable for them.

Figure 1 – Refrigerators in use in low income neighborhoods in Salvador, Bahia.

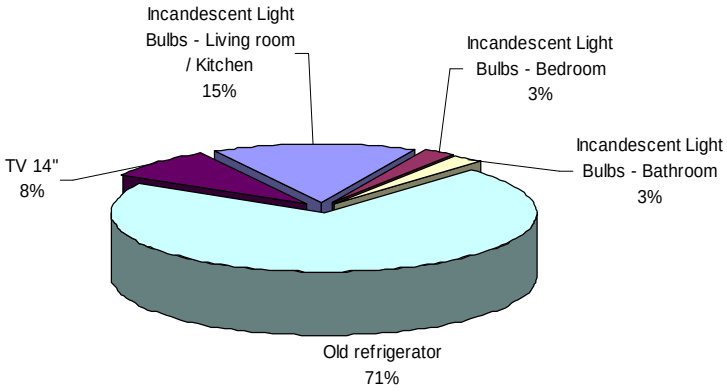
However, as energy efficiency program from COELBA will provide incentives to replace their energy-inefficient appliances with more efficient ones, these changes may be made. The emissions reductions are achieved by the replacement of low efficiency refrigerators and incandescent light bulbs with new energy efficient ones, calculated according to the weighted average emission factor fitted for the current generation mix of the region, where the proposed project activity is located (according to ACM0002).

Contribution to Sustainable Development

It has been considered that refrigerators and lighting are among the most energy consuming electrical appliances of residential use in low income neighborhoods of Salvador, Bahia (**Figure 1**). Hence, all the

low-income ratepayers included in the present energy efficiency program will be benefited by a decreasing in demand for energy use and, consequently, will achieve a rate of energy consumption that is affordable for them. It will also lead to a reduction in air pollution, improving public health and environment, as well as reducing the health care costs and increasing the quality life.

Figure 2 – Typical energy consumption of electrical appliances of residential use in low income neighborhoods



An entity engaged in the business of removing and properly managing materials that requires special handling from discarded major appliances, such as refrigerators, will be hired by COELBA in order to recycle all recyclable components from refrigerators replaced, as well as to capture and manage chlorofluorocarbons, oils, and other materials harmful to human health and to the environment. Around 130 people will be involved in the project. A key role in this project will be played by the 'Agentes Coelba', mainly formed by low income residents of the communities covered by the project.

The proposed project will also contributes to the Brazilian Government to meet its CFC's targets, since COELBA has signed an agreement with the Science and Technology Ministry and Environmental Ministry to collect all the remaining CFC of the old refrigerators that is going to be replaced. Also, the old refrigerators will stop emitting CFCs to the atmosphere due to leakages.

In addition, all the revenue due to the carbon credits will be invested in projects related to the low income residents.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Brazil (host)	COELBA, Companhia de Eletricidade do Estado da Bahia	No

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

Brazil

A.4.1.2. Region/State/Province etc.:

State of Bahia

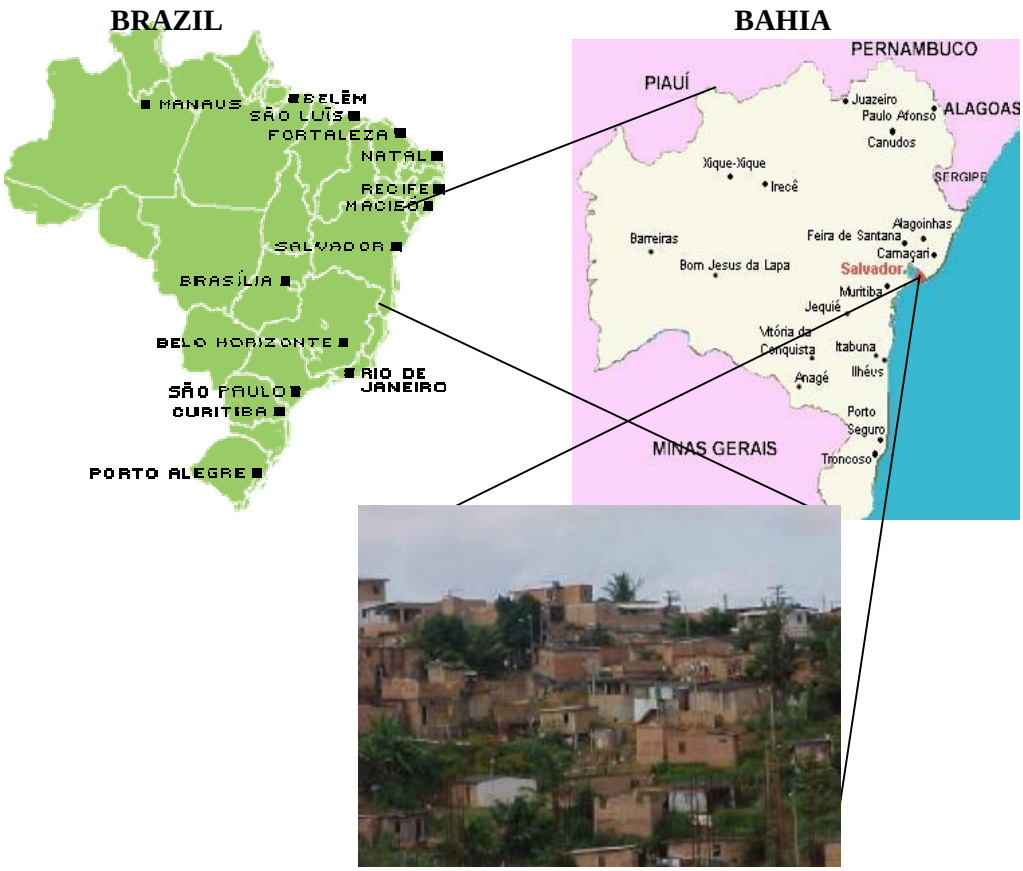
A.4.1.3. City/Town/Community etc:

City of Salvador

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

The project location will be across the low income neighborhoods of Salvador city, Bahia. The following figure (**Figure 3**) details the physical location of the Salvador, where the project activity is located in.

Figure 3 - Details the physical location of the Salvador city



A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

The small scale activity consists on energy efficiency measures at the demand side for low-income residential customers in Salvador, Bahia. Hence, the small scale methodology applicable is:

Type II.C – Demand-side energy efficiency programs for specific technologies
Reference – II.C/Version 08, Sectoral Scope 3: 23 December 2006 in the Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

The period of 10 years was chosen because it would be a time period needed to come up a new generation of more energy-efficient refrigerators. The estimated emission reduction in 10 years of crediting period is 14,913.80 tCO_2e.

Years	Annual estimation reductions in tonnes of CO_2 e
2008	1,491.38
2009	1,491.38

2010	1,491.38
2011	1,491.38
2012	1,491.38
2013	1,491.38
2014	1,491.38
2015	1,491.38
2016	1,491.38
2017	1,491.38
Total estimated reductions (tonnes of CO_2 e)	14,913.80
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (t CO_2 e)	1,491.38

A.4.4. Public funding of the small-scale project activity:

The project activity will be funded by COELBA's own resources and no public funding has been provided to the project.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

As mentioned under paragraph 2 of Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities, a proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point

The Project activity does not fit in any item under paragraph 2 of Appendix C, so that it is not a debundled component of a large scale project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

The title of the approved baseline and monitoring methodology applied to the small scale project activity is "Type II.C – Demand-side energy efficiency programs for specific technologies" as mentioned in APPENDIX B of simplified modalities and procedures for small scale CDM project activities. Version 08: 23rd of December 2006.

This methodology is available in UNFCCC's website:
http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

B.2 Justification of the choice of the project category:

The project category is applicable for the following case:

- Programs that encourage the adoption of energy-efficient equipment, lamps, ballasts, refrigerators, motors, fans, air conditioners, appliances, etc. at many sites. These technologies may replace existing equipment or be installed at new sites. The aggregate energy savings by a single project may not exceed the equivalent of 60 GWh per year.

The project activity complies with the baseline methodology in following manner:

- Energy efficiency measures consist on replacement of energy-inefficient equipments – like incandescent light bulbs and refrigerators - by new and energy-efficient ones;

- The aggregate electrical energy saving due to the project activity is 19.44 GWh per year, less than the 60 GWh per year allowed for energy savings by a single project category, so that it fits the requirements for this project category.

Thus, these measures meet the criteria set out by the project category. The project activity will remain under the limits of small scale project activity types in any year of the crediting period.

B.3. Description of the project boundary:

According to the recommendations for determining the project boundary of small scale CDM project activity category Type II.C. - Demand-side energy efficiency programs for specific technologies, specified in the Appendix B of the simplified modalities and procedures for small-scale CDM project activities, the project boundary is the physical, geographical location of each measure (each piece of equipment) installed.

B.4. Description of baseline and its development:

Under the absence of the project activity, low income residents would otherwise continue to use the existing energy inefficient equipments. The energy efficiency measures through replacement of less efficient equipments with new and more energy efficient ones in low-income residential units would lead to an electricity saving. However, in the absence of the project activity, low-income residential owners/renters would continue to use the existing energy-inefficient technologies, as explained at item A.4.3. As consequence, no reduction of GHG emissions would exist. Under these conditions, the most appropriate baseline scenario would be the extended use of the existing equipments in the absence of project activity.

According to the baseline scenario, COELBA would continue to purchase from the grid an additional amount of electricity for satisfying the equipment's energy inefficient demand for low income residential

units. As the emission coefficient for the Northeast grid electricity is 0.0767 tCO_2e/MWh[2], a proportional amount of GHG emissions would be released for each MWh additional to the project activity scenario. The grid emission factor will be monitored, as further detailed in this section B.

According to the selected project category (Type II.C – Demand-side energy efficiency programs for specific technologies) the appropriated option for possible energy baseline is the option 2: "If the energy displaced is electricity, the energy baseline is calculated as sum of devices of group 'i' replaced of power 'p_i' multiplied by average annual operations hours 'o_i' of the devices as given by the following formula:

$$E_{Bi} = \sum_i (n_i * p_i * o_i)$$

Where,

E_{BI}	annual energy baseline for devices "*i*" in KWh per year (e.g. lamp).
$\sum_i$	the sum over the group of "i" devices replaced, for which the replacement is operating during the year, implemented as part of the project.
n_i	the number of devices of the group of "i" devices replaced for which the replacement is operating during the year.
p_i	the power of the devices of the group of "i" devices replaced. In the case of a retrofit program, "power" is the weighted average of the devices replaced. In the case of new installations, "power" is the weighted average of devices on the market.
o_i	the average annual operating hours of the devices of the group of "i" devices replaced.

The energy baseline is multiplied by an emission coefficient (measured in kg CO_2e/kWh) for the electricity displaced.

Specifically for devices highly influenced by external environmental features such as temperature, for instance refrigerators, it is proposed a calculation based on the difference of average energy consumption instead of the difference of power of each device (this is especially necessary due to the fact that theoretical data gathered in laboratories could be significantly different from practical data gathered in the field):

$$E_{BII} = \sum_j (n_j * c_j)$$

Where,

E_B	annual energy baseline for devices "*j*" in KWh per year (e.g. refrigerator).
$\sum_i$	the sum over the group of "j" devices replaced, for which the replacement is operating during the year, implemented as part of the project.
n_i	the number of devices of the group of "j" devices replaced for which the replacement is operating during the year.
c_i	the energy consumption of the devices of the group of "j" devices replaced.

[2] Source: Operador Nacional do Sistema Elétrico, Centro Nacional de Operação do Sistema, Acompanhamento Diário da Operação do SIN, (daily reports from Jan. 1, 2003 to Dec. 31, 2005).

The energy baseline is multiplied by an emission coefficient (measured in kg CO_2e/kWh) for the electricity displaced.

For calculation of emission coefficient for the grid electricity, as suggested under paragraph 28 & 29 of the project category I-D from Appendix B of simplified modalities and procedures, project selects to apply option (b) "The weighted average emissions (in kg CO_2e/kWh) of the current generation mix including non renewable biomass". The emission factor for the project activity is 0.0767 tCO_2e/MWh. This emission coefficient for the grid electricity was calculated using data from National Operator of System (ONS) for North and Northeast Regions, referring to the 2003, 2004 and 2005 years, according to the I-D methodology and Approved Consolidated Methodology ACM0002.

Key variables/ data used for determination of baseline scenario

Key Variables	ID	Data Variable
Number of equipments replaced in the CDM project and their unique location	n_i	Number of devices of the group of "i" devices replaced for which the replacement is operating during the year
The rated power of the devices replaced	p_i	Power of the devices of the group of "i" devices replaced
The measured energy consumption of the devices replaced	c_j	Energy consumption of the devices of the group of "j" devices replaced
Emission coefficient of the electricity used by the project	EF_{grid}	Emission coefficient of the current generation mix of NE/N region of Brazil

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

In accordance with paragraph 28 of the simplified modalities and procedures for small-scale CDM project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used if project participants can demonstrate that the project activity would otherwise not be implemented due to the existing of one or more barrier(s) listed in Attachment A of Appendix B.

In order to demonstrate the additionality of this project, it was identified plausible and credible projects alternatives. These plausible options were analyzed according to the Attachment A of Appendix B to establish the additionality of the project and also to determine the baseline scenario.

The two possible alternatives consist in:

1. **Continuation of current practices; no project adopted by COELBA**

In alternative 1, the company won't distribute more efficient refrigerators and light bulbs to low income communities located on the City of Salvador, Bahia. This alternative is in compliance with all the regulations and legal requirements of the country. Furthermore, this alternative is a prevailing practice as the company doesn't receive any incentive to replace the old and inefficient equipment, other than the reduction of the number of clients in debt. This alternative does not confront any barrier such as financial, technological or institutional barriers.

2. **Implementation of the project activity as a CDM project activity**

The project activity is an energy efficiency improvement with CO_2 reductions due to reduced electricity consumption pattern in the households involved on it. This alternative is in compliance with all applicable legal and regulatory requirements and there is no legal requirement enforcing the replacement of less efficient devices such as energy-inefficient refrigerators and incandescent light bulbs by new and more energy efficient ones in low-income residential units. However, this alternative confronts some barriers, which are described below.

- **Barriers of the Proposed CDM Project**

(a) Investment Barriers
This CDM project activity aims to reduce emissions of anthropogenic greenhouse gas (GHG) by sources through the replacement of less efficient devices such as energy-inefficient refrigerators and incandescent light bulbs by new and more energy efficient ones.

As identified before, the only realistic and credible alternative to COELBA is the maintenance of the situation prior to the project implementation. The proposed project activity not undertaken as a CDM project activity is neither credible nor realistic since it is not financially attractive.

To participate of the programme, the households must regularize its energy bill payments. So, through the project there is an improvement of the regularity of home energy bill payments, reducing the company's financial loss with lack of payment.

Moreover, the project would cause a reduction of energy loses. The energy loses (or commercial loses) are defined as those associated with the commercialization of energy supplied to the final consumption. According to the Association of the Electricity Distribution Utilities - ABRADEE (2004), in Brazil, the energy loses are equivalent to 17%. This level is high in comparison with the international pattern. These loses are explained by the characteristics of the national electricity system; the predominance of hydroelectricity that results in long transmission systems and many energetic flows that make easier to do illegal connections. Then, to participate of the programme and receive the refrigerators, many households were regularized; also reducing the company's financial loss due to commercial loses. In a conservative manner, COELBA estimates to reduce the commercial loses in 15% of the consumption of the regularized households.

The total investment incurred only for replacing the equipment is R$21,630,728. However, the increase of revenue due to the reduction of financial loses (energy loses and reduction of households default) does not compensate the amount of investment incurred.

The investment barriers are demonstrated through the cash flow of the project, and by calculating its net present value (NPV) indicator. Furthermore, it is compared the internal rate of return (IRR) of the project with the benchmark of interest rate available to a local investor, i.e., Brazil's basic interest rate.

The financial assumptions consist on:
- 10-year crediting period;

- Average nominal Brazil's basic interest rate: 15.25% per year (source: Banco Central do Brasil - Bacen[3], July 2006)
- Inflation: Based on the Extended National Consumer Price Index (IPCA): 4,75 % per year (source: IBGE[4], July 2006)
- Average exchange rate (US$/Real): 2.2 (source: Bacen, July 2006)

The **Tables 1** and **2** below show the financial analysis of the project activity. As the NPV (without carbon) is negative (and the IRR is lower than the Brazilian interest rate), the project is financially unattractive.

Table 1 - Cashflow of the project without carbon finance – R$ (000)

Period	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Investment	18,391				3,239							
Reduction of households default	727	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455	727
Marginal Cost reduction	765	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529
Cash Flow	(16,899)	2,984	2,984	2,984	(255)	2,984	2,984	2,984	2,984	2,984	2,984	2,257

* i.e., income due to reduction of households default and energy loses.

Table 2 - Financial results without CERs

	Without CER
Net Present Value – R$(000)	(1,018)
IRR (%)	8.94%
Interest Rate (%)	10.50%

(b) Other Barriers

The other barriers consist on managerial resources, organizational capacity related to the acquisition and distribution of the new refrigerators and bulbs and the collection of the old equipment, such as the equipment delivery and storage. Furthermore, there is a high uncertainty related to the maintenance of the new equipment within the contemplate households involved on the project. Therefore, the old equipment has to be collected and destroyed, which demand more financial, managerial and organizational resources.

Considering the presence of these barriers, notably the investment barrier, the project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

In the project activity, the electricity consumption decreases thus the project activity is a case of displacement of electricity. Thus, the formula used to calculate the GHG emission reductions by sources, in accordance with the applicable project category of small-scale CDM project activities contained in Appendix B of the simplified modalities and procedures for small-scale CDM project activities, will be the difference between the Annual Energy baseline - EB and the Annual Energy of Project Activity – EB multiplied by the emission coefficient for the Northeast grid electricity, as follows:

[3] Available on: www.bacen.gov.br

[4] Available on: www.ibge.gov.br

$$GHG_{reduction} = (E_B - E_P).EF_{grid}$$

Where:

$$E_B = \sum_i (n_i \cdot p_i \cdot o_i) + \sum_j (n_j \cdot c_j)$$

$$E_P = \sum_i (n_i \cdot p_i \cdot o_i) + \sum_j (n_j \cdot c_j)$$

where

E_B	annual energy baseline in kWh per year.
E_P	annual energy project activity in kWh per year.
$\sum_i$	the sum over the group of "i" devices replaced or installed (e.g. lamp).
$\sum_j$	the sum over the group of "j" devices replaced or installed (e.g. refrigerator).
n_i	the number of devices of the group of "i" devices replaced or installed (e.g. lamp).
n_j	the number of devices of the group of "j" devices replaced or installed (e.g. refrigerator).
p_i	the power of the devices of the group of "i" devices replaced or installed (e.g. 40 W). In the case of new installations, "power" is the weighted average of devices on the market.
c_i	the energy consumption of the devices of the group of "j" devices replaced or installed (e.g. 60 kWh/month).
o_i	the average annual operating hours of the devices of the group of "i" devices replaced or installed.
EF_{grid}	emission coefficient for the Northeast grid electricity (measured in kg CO_2equ/kWh).

As earlier proved in Section B, the baseline methodology applicable to the project category is II C – Demand side energy efficiency programs for specific technologies. Since the applicability conditions of the monitoring methodology are the same as that of baseline methodology, hence the monitoring plan for the same project category is applicable to the project activity.

As also explained in section B.4, specifically for devices highly influenced by external environmental features such as temperature, for instance refrigerators, it is necessary to perform a calculation based on the difference of average energy consumption instead of the difference of power of each device. This is especially necessary due to the fact that theoretical data gathered in laboratories could be significantly different from practical data gathered in the field.

The selected monitoring methodology covers following measures:

1. If the devices installed replace existing devices, the number and "power" of the replaced devices shall be recorded and monitored while replacement is underway.

2. Monitoring shall consist of monitoring either the "power" and "operating hours" or the "energy use" of the devices installed using an appropriate methodology. Possible methodologies include:

(a) Recording the "power" of the device installed (e.g., lamp or refrigerator) using nameplate data or bench tests of a sample of the units installed and metering a sample of the units installed for their operating hours using run time meters.

OR

(b) Metering the "energy use" of an appropriate sample of the devices installed. For technologies that represent fixed loads while operating, such as lamps, the sample can be small while for technologies that involve variable loads, such as air conditioners, the sample may need to be relatively large.

3. In either case, monitoring shall include annual checks of a sample of non-metered systems to ensure that they are still operating (other evidence of continuing operation, such as on-going rental/lease payments could be a substitute).

Published values for technical distribution losses may be used. Alternatively, technical distribution losses for the grid that supplies energy to the equipment installed may be monitored.

The project activity will require measuring the following parameters mainly:

- The number of devices to be replaced, their location and ID number and the ID of new device.
- The power rating as per nameplate of the replaced device.
- Specification of old and new device.
- Electricity consumption of old and new devices.

The power will be supplied from electrical grid covering Brazilian Northeast Region, so that loss from distribution will be considered (estimated). The grid emission fact will be calculated annually (*ex-post*).

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	*Not applicable.*
Data unit:	
Description:	
Source of data used:	
Value applied:	
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

The GHG emission reductions by sources will be the difference between the Annual Energy baseline - EB and the Annual Energy of Project Activity – EB multiplied by the emission coefficient for the Northeast grid electricity, as follows:

$$GHG_{reduction} = (E_B - E_P).EF_{grid}$$

Where:

$$E_B = \sum_i (n_i \cdot p_i \cdot o_i) + \sum_j (n_j \cdot c_j)$$

$$E_P = \sum_i (n_i \cdot p_i \cdot o_i) + \sum_j (n_j \cdot c_j)$$

where

E_B	annual energy baseline in kWh per year.
E_P	annual energy project activity in kWh per year.
$\sum_i$	the sum over the group of "i" devices replaced or installed (e.g. lamp).
$\sum_j$	the sum over the group of "j" devices replaced or installed (e.g. refrigerator).
n_i	the number of devices of the group of "i" devices replaced or installed (e.g. lamp).
n_j	the number of devices of the group of "j" devices replaced or installed (e.g. refrigerator).
p_i	the power of the devices of the group of "i" devices replaced or installed (e.g. 40 W). In the case of new installations, "power" is the weighted average of devices on the market.
c_i	the energy consumption of the devices of the group of "j" devices replaced or installed (e.g. 60 kWh/month).
o_i	the average annual operating hours of the devices of the group of "i" devices replaced or installed.
EF_{grid}	emission coefficient for the Northeast grid electricity (measured in kg CO_2equ/kWh).

The parameters considered for calculating the annual energy baseline and the annual energy project activity are presented in the table below:

		BASELINE	PROJECT ACTIVITY	Total Annual Energy baseline - E_B	Total Annual Energy Project - E_P	Annual energy reduction E_B - E_P	Emission reductions - ER_y
Parameter	**Units**	*Incandescent light bulbs of 60W*	*Compact fluorescent lamps 15W*	kWh/year	kWh/year	GWh/year	tCO_2e/year
n_i - Number of devices replaced	#	154,464	154,464				
p_i - Power of the devices replaced	W	60	15				
o_i - Average daily and annual operating hours	hours/daily	5	5				
	hours/year	1,825	1,825				
EF_{grid} - Grid Emission factor	tCO_2e/MWh	0.0767					
E_B - Annual Energy **Baseline**	kWh/year	16,913,808	-	16,913,808		12.69	**972.97**
E_P - Annual Energy **Project**	kWh/year	-	4,228,452		4,228,452		

		BASELINE	PROJECT ACTIVITY	Total Annual Energy baseline - E_B	Total Annual Energy Project - E_P	Annual energy reduction E_B - E_P	Emission reductions - ER_y
Parameter	**Units**	*Refrigerator 250 liters*	*Refrigerator 250 liters*	kWh/year	kWh/year	GWh/year	tCO_2e/year
n_j - Number of devices replaced	#	17,094	17,094				
c_j - Average daily and monthly consumption	kWh/daily	1.98	0.88				
	kWh/monthly	59.49	26.54				
EF_{grid} - Grid Emission factor	tCO_2e/MWh	0.0767					
E_B - Annual Energy **Baseline**	kWh/year	12,203,065	-	12,203,065		6.76	**518.41**
E_P - Annual Energy **Project**	kWh/year	-	5,444,097		5,444,097		

B.6.4 Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tonnes of CO2 e)	Estimation of baseline emissions (tonnes of CO2 e)	Estimation of leakage (tonnes of CO2 e)	Estimation of emission reductions (tonnes of CO2 e)
2008	2,233.26	741.88	zero	1,491.38
2009	2,233.26	741.88	zero	1,491.38
2010	2,233.26	741.88	zero	1,491.38
2011	2,233.26	741.88	zero	1,491.38
2012	2,233.26	741.88	zero	1,491.38
2013	2,233.26	741.88	zero	1,491.38
2014	2,233.26	741.88	zero	1,491.38
2015	2,233.26	741.88	zero	1,491.38
2016	2,233.26	741.88	zero	1,491.38
2017	2,233.26	741.88	zero	1,491.38
Total (tonnes of CO_2e)	22,332.64	7,418.85	zero	14,913.80

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	$\Sigma N_{i,}$
Data unit:	Text/ numerical
Description:	Numbers of devices installed of group “i”, where “i” refers to lamps.
Source of data to be used:	An exact number of devices will be supplied by COELBA
Value of data	154,464 lamps
Description of measurement methods and procedures to be applied:	The data will be 100% monitored once during equipment replacement and archived on paper
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	$\Sigma N_{i,}$
Data unit:	Text/ numerical
Description:	Numbers of devices installed of group “j”, where “j” refers to refrigerators.
Source of data to be used:	An exact number of devices will be supplied by COELBA
Value of data	17,094 refrigerators
Description of	The data will be 100% monitored once during equipment replacement

measurement methods and procedures to be applied:	and archived on paper
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	ΣP_i
Data unit:	kW
Description:	Rated Power of the device installed
Source of data to be used:	Data will be provided by the manufacturers
Value of data	Compact fluorescent lamps 15W
Description of measurement methods and procedures to be applied:	The data will be 100% annually monitored and archived on electronic paper
QA/QC procedures to be applied:	Lamps: data provided by the manufacturer
Any comment:	

Data / Parameter:	Σc_i
Data unit:	kWh/month
Description:	Energy consumption of the device "j" installed, where "j" refers to refrigerators.
Source of data to be used:	Data based on field measurements.
Value of data	Refrigerator 250 liters: 59.49 kWh/month
Description of measurement methods and procedures to be applied:	The data will be 100% monitored and archived on electronic paper in the installation of the devices and annually a sample of 2.5% will be measured (uncertainty of 5%).
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	$O_{hrs,b}$
Data unit:	Hrs
Description:	Operating hours of the device "i" installed
Source of data to be used:	The will be supplied by COELBA
Value of data	Compact fluorescent lamps 15W: 1,825 hours/year
Description of measurement methods and procedures to be applied:	The data will be annually estimated and archived on electronic paper
QA/QC procedures to	Lamps- daily operational time will be estimated in the monitoring, as in the

be applied:	baseline, in a conservative manner.
Any comment:	

Data / Parameter:	EF_{grid}
Data unit:	tCO_2e/MWh
Description:	CO_2 emission factor from Brazilian N/NE interconnected grid
Source of data to be used:	Data provided by ONS (National dispatch center)
Value of data	0.0767 tCO_2e/MWh
Description of measurement methods and procedures to be applied:	The data will be calculated once a year (*ex-post*) and archived on electronic paper according to ACM0002. (For that reason the emission reduction will vary from year to year depending on the *ex-post* EF_{grid} calculation.)
QA/QC procedures to be applied:	
Any comment:	

B.7.2 Description of the monitoring plan:

- The readings taken at all places will be recorded on paper or electronically;
- The database will be managed by some kind of 'Enterprise Management System' (SAP; ERP system) implemented by COELBA to this project.
- The readings will be taken by trained operators from COELBA.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

Date of completing the final draft of this baseline section: 21/08/2006.

Contact Information: The baseline was determined by COELBA (project participant) with the special advisory of ICF International (not a project participant).

COELBA's contact information is presented in the Annex I of this CDM-SSC-PDD.

ICF's contact information is presented in the following:

Mrs. Christianne Maroun /Mr. Augusto Mello/ Mrs. Leticia Roxo/ Mr. Ricardo Vianna
ICF International
Website: www.icfi.com
Email: cmaroun@icfi.com

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

The starting date of a CDM project activity is 03/07/2006.

C.1.2. Expected operational lifetime of the project activity:

The expected operational lifetime of the project activity is 11 years.

C.2 Choice of the crediting period and related information:

A fixed crediting period will be chosen.

C.2.1. Renewable crediting period

Not applicable

C.2.1.1. Starting date of the first crediting period:

Not applicable (fixed crediting period)

C.2.1.2. Length of the first crediting period:

Not applicable (fixed crediting period)

C.2.2. Fixed crediting period:

A fixed crediting period of 10 years was chosen for the project activity.

C.2.2.1. Starting date:

01/01/2008

C.2.2.2. Length:

10 years

SECTION D. Environmental impacts

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

No significant negative environmental impacts are expected due the implementation of the project activity. On the contrary, COELBA's project should bring environmental benefits since it will result in smaller energy consumption. Also, the project will create around 130 direct jobs and it will contribute to the dissemination of energy efficiency education.

COELBA has set an agreement[5] with the Brazilian Ministry of Environment (MMA – Ministério de Meio Ambiente) to recycle and to regenerate the CFC-12 (dichlorodifluoromethane) from the old refrigerators (each refrigerator has around 100g of CFC). With the project activity implementation there will be a recycling of about 1 ton of CFC. According to this agreement, the MMA will provide the necessary training to the personnel involved and proper equipments to perform the task. The agreement also includes the correct disposal of CFC-11 (trichlorofluoromethane), which is in the foam of some refrigerators; as well as the correct disposal of the oils and metals.

The environmental agency of Bahia (CRA) will be formally contacted, but no environmental study is expected to be requested.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

Not applicable

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

COELBA has decided to visit some local stakeholders in order to present and to explain its energy efficiency project. During the visits, COELBA technicians and the stakeholders were able to discuss the advantages, perceptions and the environmental and social benefits of the implementation of the new project.

This way, first step of the invitation process was to develop a list of stakeholders. The starting point for this task was Resolution #1, released in September 2003 by the Brazilian DNA (Interministerial Commission on Global Climate Change – CIMG/MTC), defining the necessary procedures of stakeholder communications for projects in Brazil. The following stakeholders were included on the mentioned list:

- City Hall and Chamber of Council
- Brazilian NGO Forum (Fórum Brasileiro de ONG's - FBOMS)

[5] This agreement is in accordance to the Montreal Protocol, signed by Brazil in 1990 (through the Decree n° 99.280).

- Environmental Agency of the State of Bahia (CRA);
- Environmental Agency of the Municipality of Salvador
- Local Citizens Associations
- Public Attorney of Bahia

Letters were sent to local stakeholders with a description of the project and an invitation for comments.

E.2. Summary of the comments received:

The invitation letters and stakeholders' comments received will be presented to the DOE during Validation.

E.3. Report on how due account was taken of any comments received:

The starting point for this task was Resolution #1, released in September 2003 by the Brazilian DNA (Inter-ministerial Commission on Global Climate Change – CIMG/MCT), defining the necessary procedures of stakeholder communications for projects in Brazil.

The following stakeholders have been invited to comment on the project:

- City Hall – Under-Secretary of Government of the City of Salvador – Dr. Raymundo Carlos Nery Filho
- Environmental Commission of the legislature of the City of Salvador – Representative Maria Aladilce de Souza.
- Brazilian NGO Forum (Fórum Brasileiro de ONGS – FBOMS) – Esther Neuhaus.
- Environmental Agency of the State of Bahia (CRA) – Luiz César Gil – Licensing Director of the Center of Environmental Resources.
- Environmental Agency of the City of Salvador – Superintendent of Environment – Ary da Mata.
- Local Citizens Associations – Vice-President of the Residents Council of Bairro da Paz neighborhood – Antonio Carlos da Silva Santos.
- Public Attorney's Office of the State of Bahia – Coordinator of the Environmental Council – Attorney Ana Luzia dos Santos Santana.
- Besides mailing questions to stakeholders as of 04/27/2007, comments were also invited through COELBA's homepage: www.coelba.com.br

Only Esther Neuhaus from the Brazilian NGO Forum (Fórum Brasileiro de ONGs – FBOMS) did not reply.

It has been suggested by the Public Attorney that special care should be taken with the disposal of equipments. COELBA explained that the CFC – R – 12 gases from the refrigerators are being collected and properly recycled and that bulbs are being turned in for the mercury to be collected.

The Project was highly praised by all stakeholders.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

THERE IS NO PUBLIC FINANCING FROM ANNEX I COUNTRIES INVOLVED IN THE PROJECT.”

Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION

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