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**LOW INCOME ENERGY PROGRAMS**

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## TABLE OF CONTENTS

I – INTRODUCTION .....	4
II - POVERTY MEASURING.....	5
III - ELECTRICITY SECTOR OVERVIEW .....	8
IV - PRICE AND PROFIT REGULATION.....	11
IV.1 - COST OF SERVICE REGULATION.....	12
IV – 2 PRICE CAP REGULATION.....	13
V - PHYSICAL ACCESS AND CONSUMPTION ACCESS.....	14
VI – THE SOCIAL TARIFF .....	18
VII – INTERNATIONAL EXPERIENCE – USA - LOW INCOME HOME ENERGY ASSISTANCE PROGRAM .....	22
VII.1 - ADMINISTRATION .....	23
VII.2 - ELIGIBILITY.....	24
VII.3 - PROGRAM COMPONENTS .....	26
VII.4 - BENEFITS.....	27
VII.5 - RESULTS AND TRENDS .....	27
VIII - TARGETING.....	28
IX - THE COSTS OF TARGETING.....	31
X - SUBSIDIES FUNDING.....	32
XI – CONSIDERATIONS .....	33
XII – REFERENCES .....	36

## LOW INCOME ENERGY PROGRAMS

### I – Introduction

While the importance of the universal provision of energy services was first recognised as early as 1987 in the Report of the World Commission on Environment and Development (the Brundland report), the issue was brought to centre stage in 2000 in a lengthy report entitled *World Energy Assessment: Energy and the Challenge of Sustainability*, prepared jointly by the United Nations Development Program (UNDP), the United Nations Department of Economic and Social Affairs (UNDESA) and the World Energy Council. This report highlighted the strong nexus between energy and poverty and called for world action to provide access to energy services for all. The Brundland report stated:

*“Energy services are a crucial input to the primary development challenge of providing adequate food, shelter, clothing, water, sanitation, medical care, schooling, and access to information. Thus energy is one dimension or determinant of poverty and development, but it is vital. Energy supports the provision of basic needs such as cooked food, a comfortable living temperature, lighting, the use of appliances, piped water or sewerage, essential health care (refrigerated vaccines, emergency and intensive care), education aids, communication and transport. Energy also fuels productive activities, including agriculture, commerce, manufacture, industry, and mining. Conversely, lack of access to energy contributes to poverty and deprivation and can contribute to economic decline.”*

The report of the ninth session of the Commission on Sustainable Development (CSD-9) noted that the incidence of lack of access to modern energy services is most acute in rural areas and recommended that particular attention should be given to these areas. The *World Energy Assessment 2004 Update* further noted that the growing incidence of access to modern energy services in urban areas is partly responsible for the increasing concentration of people in the large cities and the migration away from rural areas. Future emphasis on servicing rural areas with modern energy services could assist in minimizing this migration towards the cities and alleviate the social problems caused by slum dwellings commonly found in the city outskirts of developing countries. The authors of the *2004 Update* also believe that there is a positive link between modern energy services and employment opportunities. They state:

*"Productive uses of energy provide employment opportunities and reduce the necessity to migrate to urban areas for employment. Productive uses allow income-generating opportunities that can help pay for the energy services, thus making them more affordable and sustainable."*

Low income residential utility customers face a much higher energy burden (i.e. percent of household income devoted to energy costs) than medium and higher income households. A 2005 study carried out by the World Energy Council – WEC showed that the Brazilian low income families spent approximately 16% of their income on energy.

The Brazilian Electricity Social Tariff is a governmental program designed to charge lower tariffs on residential consumers, especially for the low income families. Since the Social Tariff was implemented, many different conditions have been used for the concession of this benefit, such as different regional limits, different amounts of discount, and different procedures to calculate this discount.

Currently the social tariff is reduced up to 65% of its value and targeted to households with monthly consumption between 80 and 220 kWh, whose head of the household is enrolled in the Federal Government Social Programs Cadastre. The major challenge is targeting the program to the ones that really need it. The efficiency of this electricity price policy for low income families is relevant because it implies the inclusion or exclusion of a large number of families and currently, the transfers exceed US\$ 200 millions/year.

## **II - Poverty Measuring**

During the 1970s, as interest in problems of poverty increased, global development economists took the first step in measuring its magnitude within and across countries by attempting to establish a common poverty line. They went even further and devised the now widely used concept of absolute poverty. It is meant to represent a specific minimum level of income needed to satisfy the basic physical needs of food, clothing, and shelter in order to ensure continued survival.

There are several definitions of poverty and extreme poverty lines. For international comparisons, organizations such as the World Bank adopt as poverty line an income of two American dollars a day per capita, and as extreme poverty line one American dollar a day per capita. Both lines consider an

exchange rate with purchasing power parity (PPP), which eliminates the differences among the countries' costs of living. This rate takes into account price differences among countries, allowing international comparisons, unlike nominal exchange rates, which can either overvalue or undervalue purchasing power. One-dollar PPP has the same purchasing power in the country concerned (in Brazil, for example) as one American dollar in the United States.

Other institutions, such as UN/Economic Commission for Latin America and the Caribbean - ECLAC design extreme poverty lines using information about the cost structure of a geographically defined food basket that contemplates a person's minimum caloric needs. On the other hand, the Brazilian government, despite not having official poverty and extreme poverty lines, used as a reference in the design of the 2004-2007 Multi-Year Plan (PPA), the proportion of people in a family per capita income of up to half a minimum wage or up to a quarter of a minimum wage respectively. What is common in both definitions is the use of family income as the cut off point.

Although its great utility in terms of international comparisons, the poverty lines are controversial. They can, for example, deprive of characteristics the situation of the urban poor in virtue of household rental and commuting costs to be higher in the bigger urban centers. They also do not consider the non-monetary incomes, that are common in rural areas and in poor communities. Finally, the poverty lines not necessarily catch the so called "multiple dimensions of poverty". The underlying idea to this concept is that poverty cannot be defined only in material terms of survival, but it must also consider the individuals and the families who, although surviving, they are not included in the most important benefits of the urban societies, such as education, basic sanitation, health, cultural and social integration. Therefore although they are above of poverty line at some moments of its life, many families become extremely fragile, for example, when a serious illness or death occurs among its members.

It should be pointed out that the monetary income does not totally explain an individual's consumption capacity, since there are sources such as subsistence production/consumption (for example, family farming) and availability of goods and services free of charge. Family budget surveys – detailing family earnings, expenditures and how they distribute these expenditures, especially with food – are important tools for the establishment of the cut off point of poverty and extreme poverty lines. These lines, therefore, are the proxies that allow considering as poor or extremely poor

individuals whose income is under a certain monetary value that would potentially allow for the consumption of a set of goods and services.

Brazil's economic development has been problematic. Despite its immense store of natural resources and large, successfully multicultural population, the country's economic growth has been erratic and restrained by lengthy experiments with state control of important economic sectors. During the 1960s and 1970s, a largely rural economy was partially transformed by the construction of major industrial facilities such as automobile factories, petrochemical plants, refineries, and steel works. Unfortunately, the positive effects of such economic development were to some extent outweighed by three important factors: chronic inflation, the accumulation of massive foreign debt, and pronounced regional disparities in economic development that encouraged major population movements to the fast-growing parts of the country.

Brazil's income inequality is very high and persistent over time, and it has deep historic and regional roots. With an income share of the richest 20 percent of the population equal to 33 times the corresponding share of the poorest 20 percent, Brazil has one of the highest levels of income inequality in the world. The Gini coefficient for the distribution of household incomes per capita is 0.59; that is, the expected difference in income per capita between any two Brazilians chosen at random is nearly 1.2 times the average income per capita.

High inequality remains a fundamental characteristic of Brazil despite some important qualifications:

- ? New analysis shows that Brazil's income inequality has likely been overestimated as a result of limitations in the household survey data. Previous analysis also suggests an overestimation of inequality to the extent that cost-of-living differences are not fully reflected. But even with better data, income inequality would still be high.
- ? Even though aggregate measures in income inequality do not show much change over time, there have been important income improvements for the poorest, especially since stabilization in 1993, and possibly some further improvements in the last three years.
- ? Brazil has achieved major improvements in social indicators, particularly health and education. Although these were not immediately translated into less income inequality, they

improve the quality of life of the poor and create the conditions for reduction of inequality in the future.

### **Brazil Macroeconomic Data**

**Currency:** US\$ 1 = R\$ 2,69 (Jan/2005); US\$1 = R\$ 2,37 (Jul/2005); US\$ 1 = R\$ 2,28 (Dec/2005)

**Inflation:** 5,89% (2003), 7,60% (2004) ; 5,69% (2005) - IPCA tax

**GDP:** US\$ 506,784 x 1.000 millions (2003), ; US\$ 603,994 x 1.000 millions (2004),  
US\$ 617,08 x 1.000 millions (Period jan-set 2005).

**GDP Growth:** 1,9% (2002); -0,2% (2003); + 4,9% (2004); + 2,6% (jan-set05 / jan-set 04)

**Foreign reserves:** US\$ 55,408 x 1000 millions (11/01/2006)

**Exports:** US\$ 118,309 x 1000 millions (2005)

**Imports:** US\$ 73,525 x 1000 millions (2005)

**Balance of trade surplus:** US\$ 44,785 x 1000 millions (2005)

**Direct Foreign Investments:** US\$ 11,125 x 1000 millions (11/2005)

**Territory:** 8,5 million square kilometers

**Per capita income:** US\$ 3.326,21 (2004)

**Population:** 185.369.043 ( (2005)

**Population growth rate:** 1.45% (2004)

**Urban population:** 75% (2005)

**Workers:** 93 million (2004)

**Unemployment rate:** 9 to 10% (2005)

**Intra-Regional Mercosul Market:** 220 million consumers

**Sources:** IBGE, BACEN, Agência Brasil, IPEA

### **III - Electricity Sector Overview**

Brazil has the largest capacity for water storage in the world, and one of the largest transmission networks, given the long distances between power stations and consumers and the need for back-up circuits to ensure alternative supply routes and optimal regional balance in supply. Both private and government-owned companies operate in generation, transmission, and distribution. Eletrobrás,

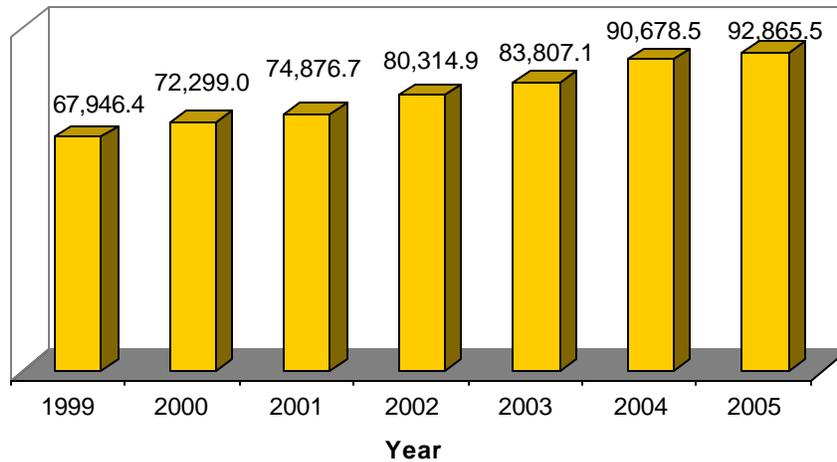
controlled by the federal government, and three other state-owned companies account for one-half of generation capacity. On the other hand, more than two-thirds of the distributors are privately owned/controlled. The transmission grid is run by a collegiate of players: producers, transmission and distribution companies, and the government through the Ministry of Mines and Energy. The Brazilian installed capacity evolution is showed in Figure III.1.

The Brazilian electric power sector is by far the largest in South America. Its installed capacity is equal to that of Argentina, Chile, Colombia, Peru, and Venezuela combined. As the third largest consumer of electricity in the Western Hemisphere, Brazil has an installed generation capacity of 92,865 MW and imports of 8,170 MW (Figure III.2). Consumption has seen a 3.6 % annual increase and hydro plants account for some 76.5% of the nation's installed capacity. Thermal plants- oil, gas and coal fuelled - represent 21.3% which is followed by nuclear power at 2.2% and renewable sources (wind and solar) at 0.03% (Figure III.3).

Statistical data indicates that Brazil's consumption is around 395 billion kilowatts/hour (Bkwh), of which 80% comes from hydroelectric power plants. This dependency on hydroelectric power has in the past been the main reason for energy shortages in the country's power sector due to periods of insufficient rainfall and a lack of investments in infrastructure.

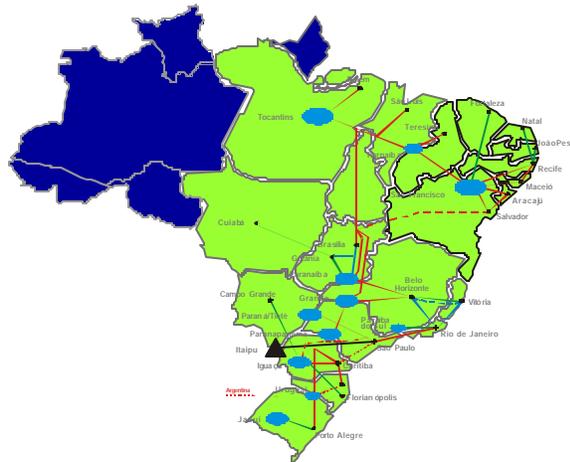
During the last decade of the 20th century, demand exceeded generation capacity due to an increase in the nation's standard of living and steady economic growth. In 2000, consumption was 58% higher than a decade earlier, while increased generation capacity was limited to just 38%. The situation reached critical proportions in June of 2001, forcing the government to implement an energy rationing program to prevent blackouts which required consumers in the Midwest, Southeast and Northeast to reduce consumption by percentages, depending on the type of customer. This program was halted in March of 2002, having created a new energy consciousness throughout the nation.

**Figure III.1**  
**Installed Capacity Evolution (MW)**

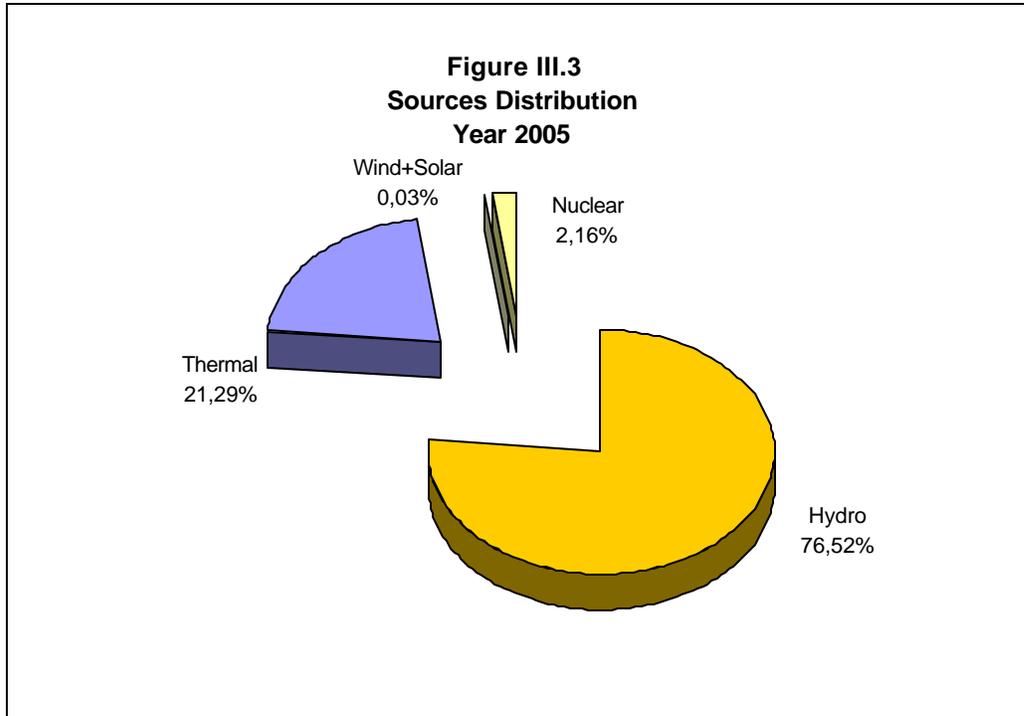


**Figure III.2**  
**Brazilian Electricity System**

- ✍ Installed Cap. = 92,865 MW
  - Hydroelectric = 71,060 MW - 76.5 %
  - Thermal = 19,798 MW - 21.3 %
  - Nuclear = 2,007 MW - 2.2 %
- ✍ Consumption Units = 56.3 million
- ✍ Energy Production = 414.6 TWh/y  
(55% of South America)
- ✍ Peak Load = 60,910 MW  
(United Kingdom or Italy)
- ✍ HV Transmission Lines = 84,512 km
- ✍ Generation: ? 2000 plants  
10 largest companies account for 70% of the installed capacity; 3 of them are private  
Altogether, of the installed capacity...
  - 15% private
- ✍ Transmission: 26 utilities
  - 60% private
- ✍ Distribution: 64 utilities
  - 80% private



Source: MME/ANEEL (Jan 2006)



#### IV - Price and Profit Regulation

The guarantee of an adequate revenue flow is of great importance to the functioning of the electric energy network, therefore if the tariffs do not cover all the costs, the concessionaire will not have conditions to fulfill its obligations of service and investment. The structure of remuneration is part of the system of incentives conceived by the government to encourage the efficient behavior of the concessionaire.

The tariff criteria include among other things, the form of control and adjustment of the prices to be charged, the degree of freedom of variation of these prices in accordance with the different categories of consumers, etc. It must consider, also, complementary mechanisms that stimulates the efficiency of the companies and benefit the consumers.

The tariff regulation models used by the Brazilian electric sector are, basically, the following ones: cost of service and maximum price (price-cap).

## IV.1 - Cost of Service Regulation

The cost of service is a system of regulation where the regulator observes the operator's accounting records and lowers or raises the operator's prices to keep the company's profits near its cost of capital.

Regulation is sustainable over long periods of time if there is no competition because prices can be adjusted to the company's changing conditions. The rate of return - ROR tools provide only weak incentives for companies to operate efficiently. The Averch-Johnson Effect says that companies have an incentive to over invest in facilities when the estimated cost of capital is greater than the company's actual cost of capital at the margin, and that companies have an incentive to under invest in facilities when the cost of capital calculated is less than the company's actual cost of capital at the margin.

Companies have reduced incentive to control costs because shareholder interests in profits are at least somewhat protected by the regulator, not by management. Regulators must find, quantify, and charge to shareholders any excess costs. If this is hard, management may spend money on things it wants because there is little or no harm to shareholders. If regulators are overly zealous in finding costs that look inefficient, companies may be too timid to do things that would benefit customers, but that may be difficult to explain to regulators.

Regulators generally try to remedy these perverse incentives through regulatory lag, sliding scales, and efficiency audits/reviews.

**Regulatory lag** is the time lag between when a company incurs a cost or receives a revenue and when the regulator responds to this by raising or lowering the company's prices

**Sliding scales** are earnings sharing mechanisms. For example, a regulator may allow the company to earn profits above its cost of capital, but require the company to share some percent of these extra profits with customers through refunds or lower prices.

**Efficiency audits/reviews** are audits by regulators that try to assess the operational efficiency of the company by looking for places where the company has been imprudent or has costs that are unnecessary to provide the utility service.

#### **IV – 2 Price Cap Regulation**

The price cap is a system of regulation where the regulator sets prices without reference to the costs the company incurs during the period the prices are in effect.

With pure price caps, the regulator never directly observes the operator's profits. This form of price caps is rare and indeed may never be practiced except in instances where the regulator is prohibited by law from observing costs and adjusting prices.

Most price cap regimes base prices on past costs or expected costs and prohibit the regulator from adjusting prices according to new information for a set period of time, typically 4-6 years.

These regimes resemble rate of return regulation. The critical differences are that these price cap regimes have fixed time periods between price reviews, while under rate of return regulation price reviews are triggered by high or low earnings (relative to the cost of capital).

Price cap regulation provides companies with incentives to improve efficiency. It also dampens the effects of cost information asymmetries between companies and regulators. However, incentives to over-invest in capital and to cross-subsidize are less than those prevalent in cost-of-service regulation.

In price cap regulation, the regulatory lag doesn't have to be too much extensive, in view of the regulator difficulties to audit the companies and observing changes that can generate extreme profits or damages. The definition of the regulatory lag, together with the level of the price-ceiling, is an important instrument to reduce the risks and to balance the benefits between the agents. For example, the reduction of regulatory lag for very short intervals can reduce the concessionaires chance to appropriate extraordinary profits, while that the setting of a high price-CAP would benefit

the firms but it would not allow the appropriation, by consumers, of an unexpected reduction in the costs.

Figure IV.1 shows the average supply tariff values applied in the country, by consumption class and by region, in December/2005.

**Table IV.1**  
**Average Supply Tariff**  
**Regional and Brasil ( US\$/MWh)**  
**Reference: 2005/December**

<b>Class</b>	<b>North</b>	<b>Northeast</b>	<b>Southeast</b>	<b>South</b>	<b>West</b>	<b>Brasil</b>
Residential	121	109	135	126	125	128
Industrial	86	77	83	76	90	81
Comercial	118	115	116	109	120	115
Rural	86	70	81	65	80	73
Government	120	123	118	118	125	120
Street Lightning	68	69	73	65	69	70
Public Services	75	70	75	74	75	74
Self-Consumption	121	122	129	107	137	124
<b>Average Tariff</b>	<b>107</b>	<b>97</b>	<b>109</b>	<b>94</b>	<b>109</b>	<b>104</b>

## **V - Physical Access and Consumption Access**

Although most of the quarrels on reforms and privatization have been focused in the question of the economic efficiency, the distributive aspects have a important role to play in the process of electrical systems reorganization in view of that electricity is strongly related with income growth and human development.

The experience on the reforms has demonstrated that the perception of a weak financial return face to intensive capital requirements for the extension of electric networks, takes many suppliers to postpone the maximum possible the attendance to the poor segments of the population, unless specific policies foster/oblige them to behave different. This reality demands a special attention from the State, whose efforts must be directed towards two main objectives: to promote the services covering expansion and to guarantee the accessibility to the prices.

The first point is related to the physical access to the power service, i.e., the possibility of having the service available to be used. The second point is the continuous access to the electricity service. Even being physically connected to the net, parcels of the population do not possess income to face the costs of the service. The consequence of this difficulty is the disproportionate allocation of the familiar income for this segment or the cut to the access that, usually, is not effective, leading to a clandestine connection.

The two points are linked by the same characteristic: the affected population. In both cases, the physical connection and the economic access, the reached population is the same one: the most poor and excluded social extracts of the society. Those points put in context the problem of the universalization and send to another concept, the guarantee to each citizen of the right to the access and to a minimum level of electricity consumption to satisfy its basic necessities. It fulfills to the granting authority, acting on the basis of the pertinent legislation, to guarantee the conditions these services must be served to the population in general, defining its amplitude and funding.

The establishment of covering extension goals can be a good option to guarantee the connection of net physically isolated groups of consumers as well as non-lucrative consumers, but it is necessary to take into account that the level and the scheduling of investments along the time have direct implications in the suppliers companies cash-flow and consequently on tariffs.

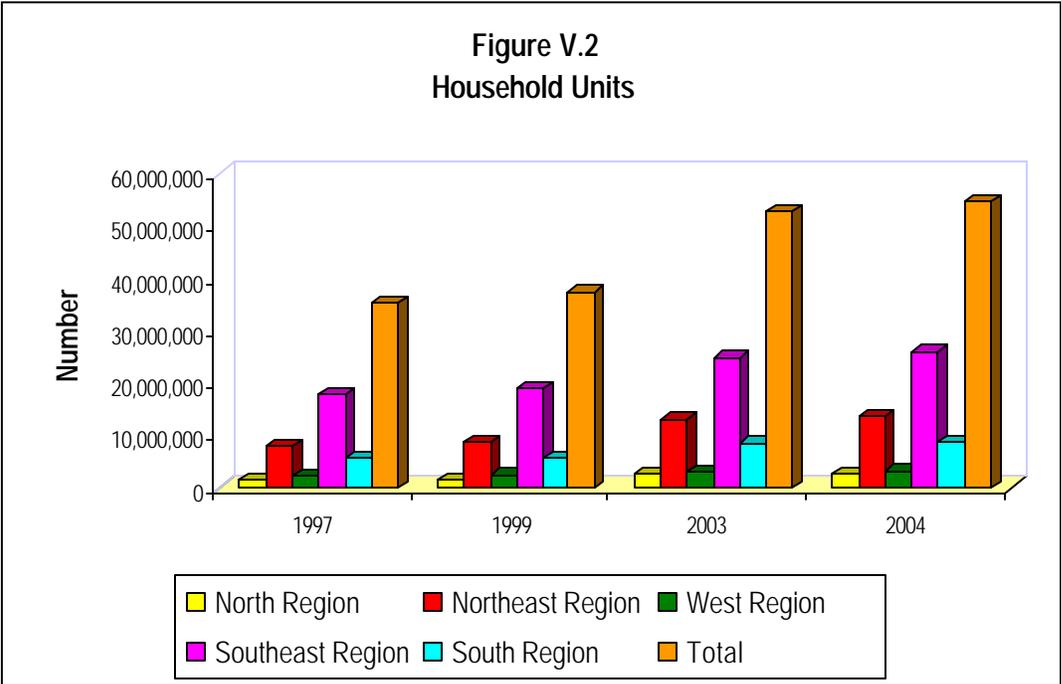
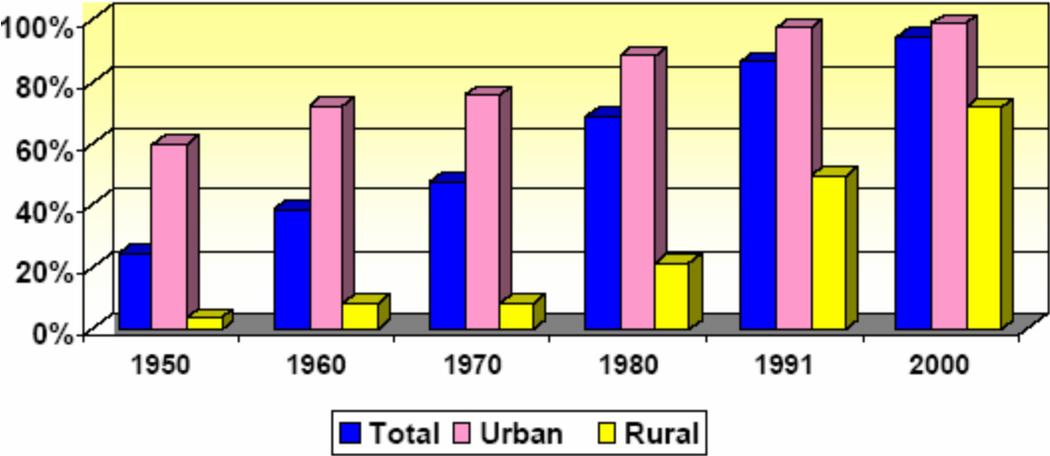
The access to the tariffs can be influenced by the service cost reduction and electricity bill payment flexibility, or still, for the concession of cross-subsidies (some customers pay prices in excess of costs to subsidize the low income consumers) and/or external subsidies (government funded-subsidies) if provided on an equitable and sustainable basis.

The cross-subsidies seen as a special case of income re-distribution, frequently are compared with the alternative of direct transference to the consumers. Under the economic efficiency approach, direct transfer would be the best option because the relative prices of the economy would not be modified and each one would pay the pertinent price.

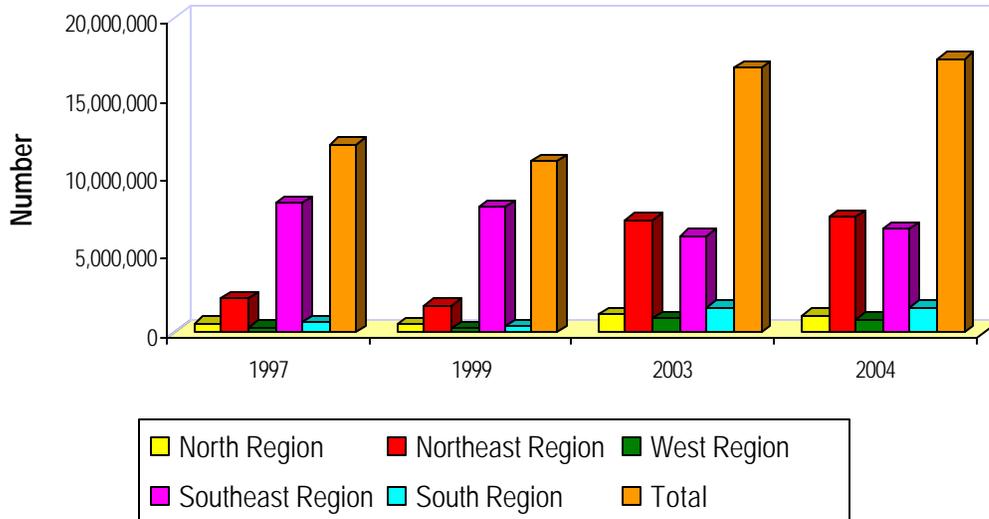
The effort that was undertaken in the country in the last decades made the household connection evolved from 60 % in the fifties to 94.5 % in year 2000, as it is observed in Figure V.1. In these five

decades the number of domiciles in the country grew about 34,7 million, while the number of domiciles with electric energy grew around 40 million, representing an average increment of 1 million of connections above of the vegetative growth each 10 years. Figures V.2, V.3 and V.4 shows the distribution of total and low income household by the different geographic Brazilian regions.

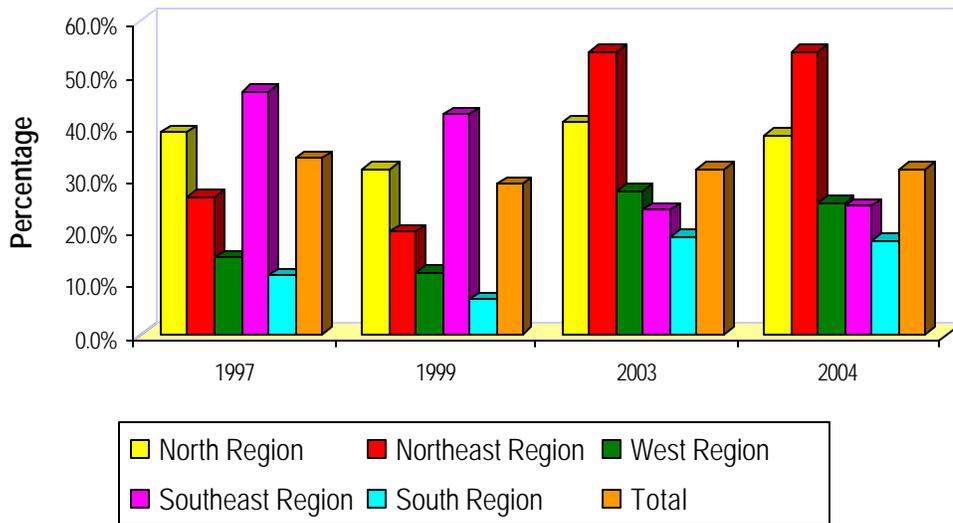
**FIGURE V.1**  
**BRAZIL**  
**CONNECTED HOUSEHOLDS**



**Figure V.3**  
**Low Income Household Units**



**Figure V.4**  
**Low Income Household / Total Household**



## VI – The Social Tariff

In December of 1973, when almost all the Brazilian electric sector was composed of state-owned companies, the government imposed identical tariffs to all the regions of the country. Considered the classification of a consumer in one of the tariff categories, the price of each unit of energy was equal, independently of local supplier, its structure of costs or the characteristics of its the market.

The financial balance of the distribution concessionaires capital was done by an account called "Global Reserve of Guarantee - RGG" that made the transference of capital from the surplus to the deficit utilities. This tariff policy discouraged the search of efficiency by part of the surplus companies, those that operated in more income-producing markets or had a more competitive cost structure, once they could appropriate the profit of its operation. Additionally in this period, the tariffs had been readjusted in inferior levels to the inflation for macroeconomic purposes.

This policy generated a high level of intra-sector default, the distribution concessionaires did not pay the purchases due to the generating companies, mainly owned by ELETROBRÁS (a state-owned holding of other federal companies), under the allegation of financial difficulties caused by the tariff freezing. The distribution companies received the bills from the consumers, but they did not pay the power purchase. This behavior led to a US\$ 26 billion deficit in 1993, amount between 20 % and 25% of the national debt at that time, covered, after all, with resources from the National Treasure.

Up to 1995, Brazil did not have a social tariff, but a tariff subsidy extensive to all the residential consumers, with decreasing discounts for different blocks of consumption, independently of the total consumption, as presented:

Consumption	Discount
0 a 30	83%
31 a 100	55%
101 a 200	24%
Over 200	0%

The indistinct application of those discounts to all the residential customers deprived of characteristics the true social reach of the measure and represented an important distortion due to the suppliers billing reduction.

As a government decision, aiming at the financial sanitation of the electric sector, whose capacity of investment was depleted due to its high degree of indebtedness and the depressed value of the tariffs, the reorganization of the Brazilian electric sector started in 1993 with the Law nº 8.631. This law established, amongst others, a non-equal tariff system where the tariff levels would have to correspond to the necessary values for the covering of the cost of the service of each supplier, according to its specific characteristics.

A set of laws, from 1995, established the legal basis for continuous reorganization, that had launched the following innovations:

- ? competition in the segments of generation and commercialization;
- ? open access to the transmission and distribution grids;
- ? incentive regulation of the segments that, at least initially, would remain monopolistic, i.e., distribution and transmission.
- ? creation of the Brazilian Electricity Regulatory Agency - ANEEL, the National Electric System Operator - ONS, and a Wholesale Energy Market, where the sale and purchase of power would take place.
- ? privatization of state-owned electricity companies.

In November 1995, the National Water and Electricity Energy Department - DNAEE, that would come to be succeeded by the National Electricity Regulatory Agency - ANEEL in 1996, issued Portaria nº 437 creating the Low Income Household Subclass aiming to identify, among the residential consumers, those of low purchasing power, in order to apply a special tariff policy. However the DNAEE attributed to the distribution companies the responsibility for setting the eligibility criteria for participation.

The diversity of consumers framing criteria of the Low Income Household Subclass considered by the suppliers, such as family income, area of the property, standard of housing (wood/brick, slum quarters), residence in the periphery of the cities, ownership of telephone, number of electric outlets and installed load, disclosed the possibility of a disequilibrium in the discounts concession among the different concessionaires. There was a concessionaire who showed up the rate of 80.59% of the residential consumers classified in the Low Income Household Subclass and in the other extremity, two concessionaires who had not presented any residential consumer as low income.

In view of those disparities, from 1996, in a process finished in 1997, the DNAEE defined, for each concessionaire, the low income consumers characteristics, but some inconsistencies still remained. The discounts had kept the scheduling philosophy, with the important difference that now limited to the consumers classified in the low income subclass, as shown:

<b>Consumption</b>	<b>Discount</b>
0 a 30	65%
31 a 100	40%
101 a 200	10%
Acima de 200	0%

In April 2002, the Brazilian Congress passed Law No.10,438, which provided for the reduction of tariffs to low income consumers, the establishment of targets for concessionaires, and the granting of permission to permit-holders to provide full coverage. The law also created a national fund, the Energy Development Account - CDE, to promote universal access and use of innovative sources of energy. The National Electricity Regulatory Agency - ANEEL issued the necessary regulation to implement the law, whereby concessionaires must provide full coverage under a target plan. In parallel, the Ministry of Mines and Energy prepared a program to accelerate universal access by ensuring additional resources and by creating rules for use of CDE. Financial resources from CDE can be granted to accelerate the achievement of the targets. ANEEL is responsible to monitor the progress and the results achieved by utilities in the implementation of electrification programs. Those

not meeting the targets will be subject to sanctions, mainly a reduction in the tariff increase, when the tariffs are periodically reviewed by ANEEL.

Law No.10,438 of April 2002, laid down, among other things, a substantially change in the social tariff design: uniform criteria for the whole country and new requirements for eligibility, however the discounts percentiles have remained the same, as shown:

<b>Consumption</b>	<b>Discount</b>
0 a 30	65%
31 a 80	40%
Over 81 up	10%

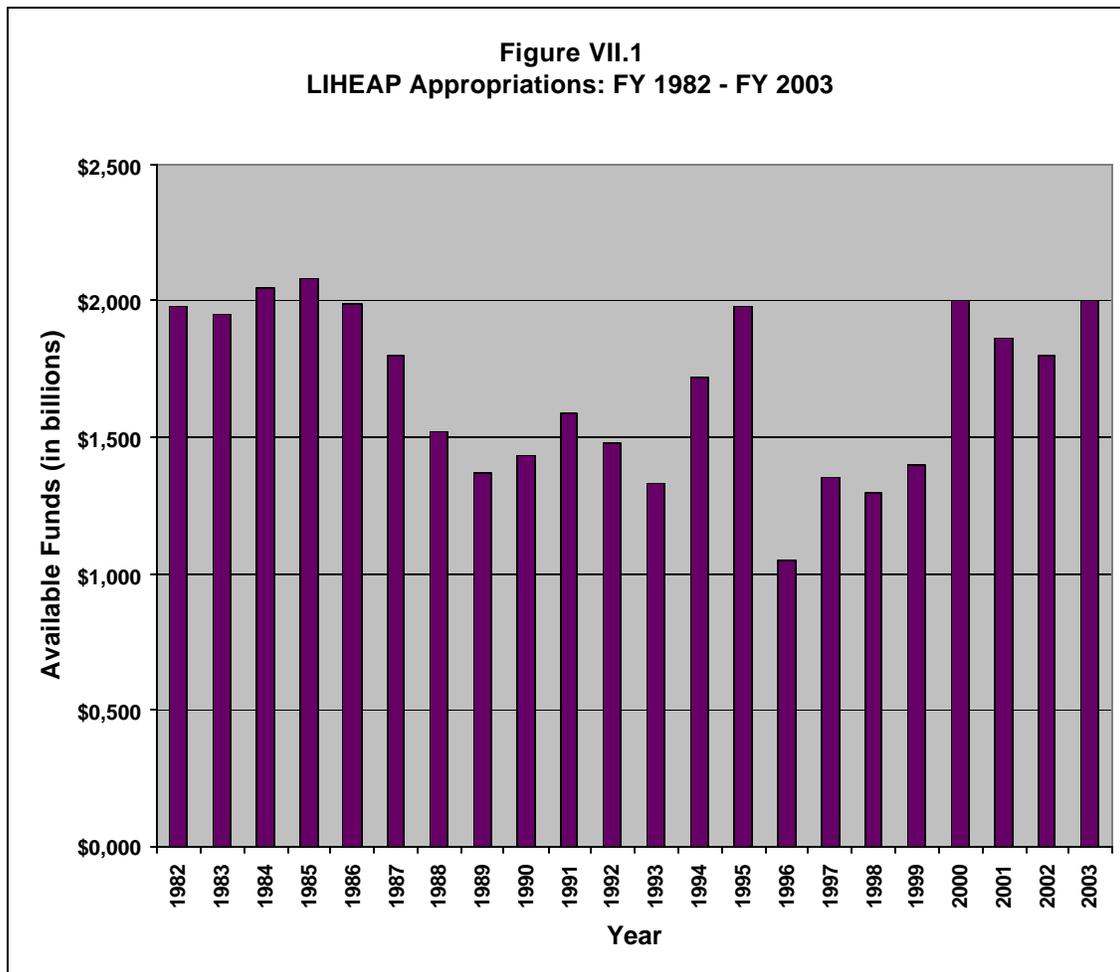
According to the new criteria, all the single-phase consumers, with monthly consumption up to 80 kWh (**mobile average** of 12 months), independently of its income or any other characteristics, are automatically eligible for the social tariff, in the terms of Resolution ANEEL n° 246 of 2002. To mitigate the inclusion of summer residences, the regulation determines the exclusion of the household with two registered consumption over 120 kWh/month in the period of one year, even having monthly average under 80 kWh in this period.

The single-phase household, whose average consumption of last 12 months in the band between 80 and 220 kWh, is eligible for social tariff only if it is registered in the assistance programs for needy households of the Federal Government. Additionally, the average income per capita of the household members can not exceed the half minimum wage.

The methodology to evaluate the concessionaires revenue losses brought by the new rules was established by Resolution ANEEL n° 89/2003.

## VII - International Experience: USA – Low Income Home Energy Assistance Program (LIHEAP)

The Low-Income Home Energy Assistance Program (LIHEAP) is a block grant program under which the federal government gives annual grants to states, the District of Columbia, U.S. territories and commonwealths, and Indian tribal organizations to operate multi-component home energy assistance programs for needy households (Figure VII.1).



The LIHEAP statute provides for two types of program funding: regular and contingency grants. Regular funds are allotted to states according to methods prescribed by the LIHEAP statute and the method of allotment may change based on the funding level. For FY2005 Congress made \$1.885 billion in regular LIHEAP grants available.

Emergency funds may be released and allotted to one or more states at the discretion of the President and the Secretary of Health and Human Services (HHS). The funds may be released at any point in the fiscal year to meet additional home energy assistance needs created by a natural disaster or other emergency. In FY2005 Congress provided \$298 million in emergency funds for contingency purposes.

The regular LIHEAP program consists of three components for assisting low-income households with their needs:

- ? heating or cooling funds (i.e., fuel subsidies) to increase the affordability of home energy;
- ? energy crisis intervention to assist weather-related and fuel supply shortages and other household energy-related emergencies, such as utility shutoffs; and/or
- ? low-cost residential weatherization and other energy-related home repairs to safely increase the efficiency of a household's use of home energy, thus lowering home energy bills and making homes more comfortable. A set of measures designed to reduce heat gain and/or heat loss (and thereby energy consumption). Common weatherization measures are weather stripping, ceiling and wall insulation, and storm windows and doors.

The federal government funds the LIHEAP program by providing a percentage of a block fund to each state. This block grant allows each state to have considerable latitude in the design of various aspects of their LIHEAP programs including administration of the program, client eligibility, program components, and benefits/assistance provided.

### **VII.1 - Administration**

The LIHEAP program is most often administered by existing state and local agencies. There is administrative overlap among the three components of LIHEAP and among related human services programs including: the Community Services Block Grant (CSBG), the Department of Energy's Weatherization Assistance Program (WAP), and the Temporary Assistance for Needy Families (TANF).

In the majority of states the same agency is responsible for the bill assistance and the crisis assistance portions of the LIHEAP program. In over half of the states, the programs are administered by the state welfare department which also runs the TANF program. In the remaining states the LIHEAP billing and crisis assistance is administered by other state agencies including the Departments of Commerce, Development, Housing and Community Development or Energy. The weatherization portion of the LIHEAP program is also generally administered by one of these departments. The same agency is also often responsible for the Federal Weatherization Assistance Program (WAP). The majority of states agencies contract directly with local community action agencies and other community based non-profits to deliver the programs.

The Low-Income Home Energy Assistance Program (LIHEAP) is not an entitlement program, meaning that you are not guaranteed help because you meet certain criteria. Congress provides a specific amount of money each year for LIHEAP.

When the LIHEAP funds are gone, LIHEAP grantees can no longer provide federal help until Congress provides funds for the next Federal Fiscal Year that begins on October 1st of each year. Therefore, it is possible (at the time one applies) that a state will have exhausted its available federal LIHEAP grant monies, and thus be unable to serve additional households even if those households are eligible to receive help.

## **VII.2 - Eligibility**

The agencies that administer LIHEAP are responsible for setting the eligibility criteria for participation. The Low Income Energy Assistance Act does however set out maximum eligibility levels based on the poverty guidelines (Table VII.1). The statute states that the maximum income level for LIHEAP recipients cannot exceed 150% of the federal poverty guidelines, (except where 60% of a state's median income is higher). Individual states, however, may reduce this maximum income limit to as low as 110 % of the federal poverty.

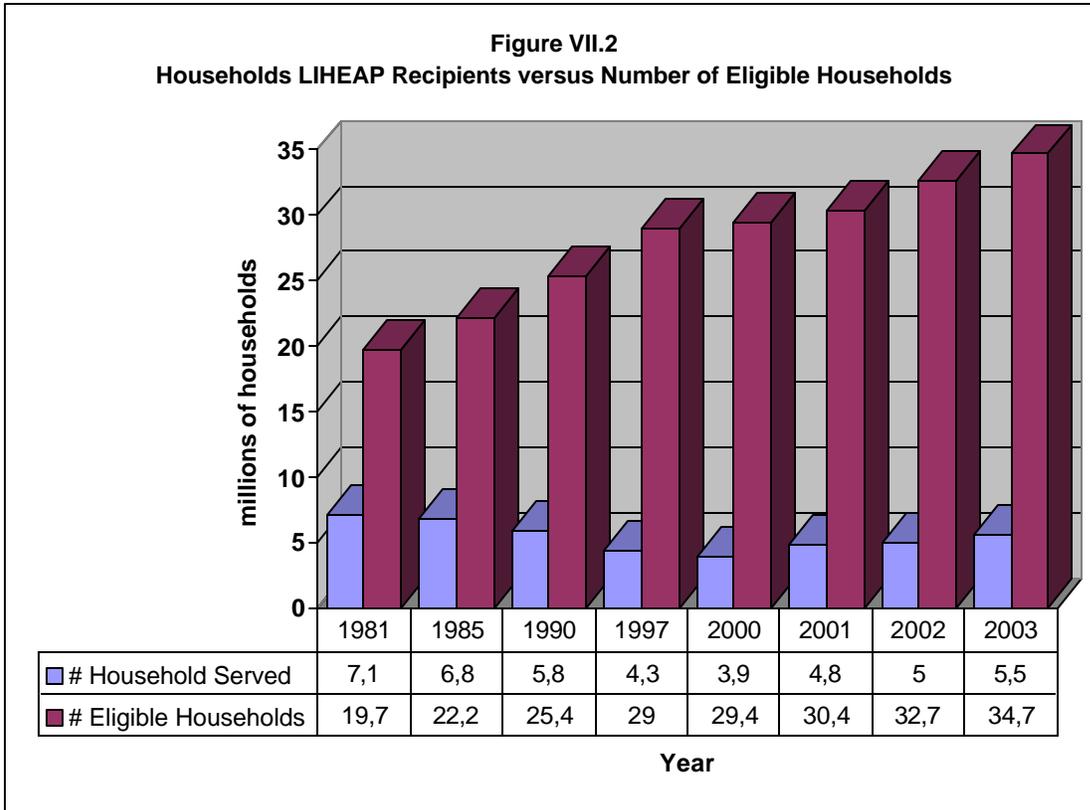
**Table VII.1**

**2002 HHS Poverty Guidelines**

Size of Family Unit	48 States & D.C. (\$)	Alaska (\$)	Hawaii (\$)
1	8,860	11,080	10,200
2	11,940	14,930	13,740
3	15,020	18,780	17,280
4	18,100	22,630	20,820
5	21,180	26,480	24,360
6	24,260	30,330	27,900
7	27,340	34,180	31,440
8	30,420	38,030	34,980

Source: US Department of Health and Human Services

In determining eligibility for LIHEAP, the state agencies not only take into consideration the applicants household income, but also their assets (Figure VII.2). They may also target or prioritize certain households such as the elderly or handicapped. The eligibility criteria for LIHEAP differ from state to state also between different components of the LIHEAP program. For example, the maximum income level for receiving bill assistance may be different from that for receiving LIHEAP weatherization services.



### VII.3 - Program Components

The state agencies responsible for administering the LIHEAP program can determine what proportion of the block grant goes to which program components, subject to: low-cost weatherization projects limited to 15% of allotment unless grantee has waiver for up to 25% and services to reduce need for energy assistance limited to 5% of allotment.

In 2004 the proportion of the grant each state set aside for heating bill assistance ranged from 13% in Florida to 87% in Connecticut. Most states do not set aside any funds for cooling bill assistance, however Missouri plans to spend 25% of the grant on helping low income households pay their cooling bills. For crisis assistance the states dedicate anywhere between 1% and 30% with 13% being the average. Each state also sets aside approximately 10% to 15% of the grant for weatherization programs.

#### **VII.4 - Benefits**

The overall consideration for states in establishing benefit levels for the LIHEAP programs is the annual LIHEAP allocation from the block grant. Beyond that, the states establish benefits based on a variety of criteria tailored to the needs and characteristics of their low income populations. In order to tailor their benefits to the needs of the households, states have used a number of criteria to establish levels including: income, household size, energy cost, fuel type, climate/region, dwelling type, energy burden, and energy need.

Congress has encouraged program administrators to specifically consider “energy burden” and “energy needs” in establishing benefits. “Energy burden” is defined as the expenditures of the household for home energy divided by the income of the household. “Energy needs” means taking into account both the energy burden of a household and the unique situation of a household that results from having members of vulnerable populations, including very young children, individuals with disabilities, and frail older individuals.

In 2003 the maximum assistance given for heating bills in each of the states ranged from US \$150 in Florida to US\$ 2,450 in Alaska. The average maximum benefit was around US\$ 650. Similar numbers were found for the crisis assistance benefits, these ranged from US\$ 100 in Hawaii to US\$ 2,450 in Alaska.

#### **VII.5 - Results and Trends**

In 2001 an estimated 4.6 million low income households received LIHEAP heating and/or cooling assistance from the \$1.8 billion in funding granted to the states. However, this level of funding only made it possible to assist 15,5% of the more than 29 million income-eligible households.

The level of LIHEAP funding has been reduced in recent years, and has struggled to keep pace with the need. For example between 1981 and 2000, the number of federally eligible households rose by 49%, however, the LIHEAP funds increased by only 22%.

Not only has the number of LIHEAP recipients decreased, but also the proportion of their energy bills the program covers decreased. For example, the percentage of the total home heating bill covered by LIHEAP decreased from 23% in 1981 to 11% in FY 2000.

The decreased funding of the LIHEAP program has resulted in a trend towards targeting, and states serving the neediest households first. The vast majority of LIHEAP - recipient households include elderly, people with disabilities, or young children, and are at or below 150% of the federal poverty standards. For example, of the households receiving assistance in FY 2001, about 32% had at least one member 60 years or older, about 30% included at least one disabled member and about 22% included at least one child five years or younger.

## **VIII - Targeting**

One of the great difficulties in social programs implementation is the definition of the target-public, i.e., to define who are the ones that really need the program. This effort, called targeting, uses several techniques in the attempt to evaluate the set of necessary attributes for the characterization of an individual in particular as a member of the target-public.

Targeting subsidies to the poor has three potential benefits. First, targeting has the potential to lower the subsidy budget or the cost of providing the subsidy. If only some households receive the subsidy, the amount of revenue the utility needs to obtain through cross-subsidies or from some external source to fund the subsidies it provides is reduced. Second, targeting means a greater potential impact on poor households for a given subsidy budget, because such targeting should allow a larger proportion of the total subsidy budget to benefit the poor. Third, subsidies that are targeted to fewer households have the potential to cause fewer distortions in consumption decisions than untargeted or poorly targeted subsidies.

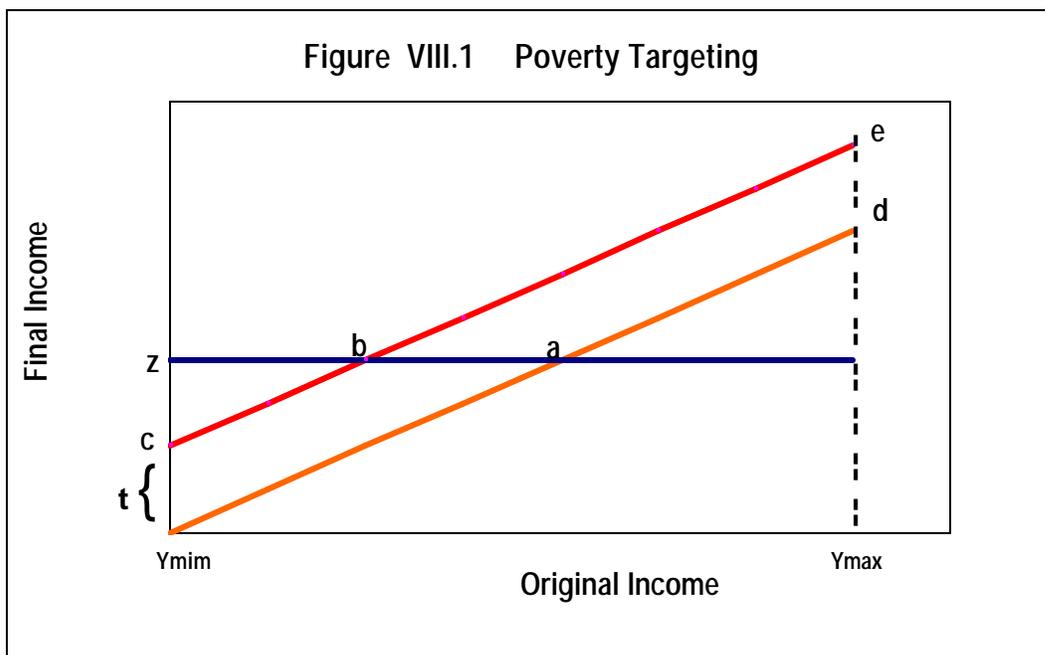
Targeting is a means of increasing program efficiency by increasing the benefit that the poor can get within a fixed program budget. The case for targeting is tantalizingly simple. Imagine an economy with 100 million people, 30 million of whom are poor. The budget for a transfer program is \$300 million. With no targeting, the program could give everyone in the population \$3. If the program could

be targeted only to the poor, it could give each person \$10 and spend the full budget, or it could continue to give each person \$3 for a budget of only \$90 million.

More generally, the motivation for targeting arises from the following three features of the policy environment:

- **Objective:** the desire to maximize the reduction in poverty or, more generally, the increase in social welfare
- **Budget constraint:** a limited poverty alleviation budget
- **Opportunity cost:** the tradeoff between the number of beneficiaries covered by the intervention and the level of transfers.

These three features imply that targeting transfers at poor households has a potential return, namely, that the amount of the transfer budget going to those households deemed to be most in need of transfers can be increased.



This concept can be expressed graphically (Figure VIII.1). As a policy maker, suppose we have a fixed transfer budget just sufficient to eliminate consumption poverty. We have representative household survey data and, using this, we graph consumption levels of individual households before any transfers to them, ordering them from worst to best off. This ordering is represented on the x-axis as "original income," while a household's income after the transfer is given on the y-axis as "final income." The maximum and minimum household incomes in the survey are  $Y_{max}$  and  $Y_{min}$ , respectively, and  $z$  is the poverty line. The line  $dY_{min}$  shows that, by definition, before the transfer program is in place households' final incomes are equal to their original incomes. The optimal transfer scheme is one that gives a transfer to all poor households only (i.e., those with income less than  $z$ ), with transfer levels equal to their individual "poverty gaps," that is, the distance between their original income and the poverty line,  $za$ . This transfer program brings all poor households up to the poverty line; all non-poor households have equal final and original incomes. The poverty budget is represented by the area  $zaY_{min}$  and is the minimum budget required to eliminate poverty.

Consider the case of a uniform transfer program, which gives the same transfer equal to  $t = c - Y_{min}$  to all households, both poor and non-poor. Because of the leakage of transfers to non-poor households, the transfers to poor households are no longer sufficient to eliminate their poverty. Two forms of "inefficiency" are associated with the uniform transfer:

- Non-poor households receive a transfer.
- Some poor households (those in the line interval  $ba$ ) receive transfers greater than their poverty gaps.

As a result of these inefficiencies, the poverty impact of the uniform transfer scheme is less than that of the optimal transfer scheme, less by the area  $zcb$ . The total leakage of the budget (reflecting the two sources of inefficiency identified above) is given by the area  $bade$ , which for a fixed budget must also equal the area  $zcb$ , which equals the level of poverty after the uniform transfer program. Therefore, imperfect targeting results in a lower poverty impact for a given budget. Improved targeting involves screening some of the non-poor households out of the program.

## IX - The Costs of Targeting

The scenario outlined above illustrating the benefits of targeting assumed that it was possible to distinguish who is poor and who is not. In fact, there are costs to acquiring information about who is needy and, even then, such information is rarely perfect. These costs can be classified as follows:

- **Administrative Costs:** These costs include the costs of collecting information, for example, conducting means testing of households or conducting a survey on which to base a poverty map. These costs mean that less of the budget is available to be distributed to beneficiaries. In general we expect that the costs of gathering information to target will increase with the precision of the targeting. It is possible that if finer targeting means that the total number of beneficiaries declines, the total administrative costs will decline, either absolutely or a share of total costs. This would result from two forces. First, a targeted program may serve a smaller number of people, so the overall scope of machinery to deliver benefits could be smaller. Second, if the tighter targeting allows a larger benefit per client, the share of administrative costs will be lower.
- **Private Costs:** Households also incur private costs involved in taking up transfers. For example, workfare programs involve households incurring an opportunity cost in terms of forgone income opportunities. Queuing involves similar, though usually much smaller, opportunity costs. Households may face cash costs for obtaining certifications required for the program, such as a national identity card or proof of residency or of disability, and for transportation to and from program offices. Private costs, which are often overlooked when evaluating programs, may be quite important, especially when selfselection methods are used or when access to the program is conditioned on actions (e.g., keeping children in school) by the household.
- **Incentive Costs:** These are often referred to as *indirect costs*. They exist because the presence of eligibility criteria may induce households to change their behavior in an attempt to become beneficiaries. For example, a program open only to those below a minimum income may cause some households to reduce their labor supply and thus their earned incomes. This is one of the reasons why transfers that guarantee a minimum income irrespective of earnings are not considered desirable.

- **Social Costs:** These costs may arise when the targeting of poor households involves publicly identifying households as poor, which may carry a social stigma. If the poorest households do not take-up the transfer as a result, then this decreases the effectiveness of the program at getting transfers into the hands of the poorest.

- **Political Costs:** Excluding the middle classes may remove broad-based support for such programs and make them unsustainable if voter support determines the budget and is in turn determined by whether the voter benefits directly from the program.

## **X - Subsidies Funding**

The subsidy resources generally come from a governmental fund and/or cross-subsidies among groups of consumers. Cross-subsidy occurs when the revenue earned in excess of costs from some customers is used to offset losses created by a subsidy program and the most common form of this practice are for industrial consumers to pay prices in excess of costs to subsidize residential consumption, and for high-volume consumers within the residential customer class to subsidize low-volume users.

The cross-subsidy, seen as a case of income redistribution, frequently is compared with the alternative of direct transference to consumers. Government transfers are often unreliable and may undermine managerial incentives, so that subsidies are ultimately absorbed by inefficiencies within the utility rather than passed on to customers. Cross subsidies create distortions in pricing that affect consumer behavior and that may ultimately undermine financial sustainability of the utility by creating incentives for customers to turn to self-provision or become a free-consumer.

Government-funded subsidies can be delivered in a variety of ways:

- ? transfer the subsidies directly as a cash payment to the beneficiary household;
- ? make a cash payment to the utility against proof that a subsidy was provided to a specific consumer;

- ? utility receive general financial support (grants, tax exemptions, guaranteed low prices for inputs, loan guarantees, support for research and development, etc.)

An alternative approach is for utilities to incur losses by providing subsidies to consumers and then to be reimbursed by the government, as is the case of Brazil.

Cross-subsidies are popular because they appear to permit utilities to achieve cost recovery without relying on central government transfers, but this requires the right balance between subsidy recipients and cross-subsidizers.

It is sometimes argued that financing subsidies from government funds is desirable because it avoids distortions in utility price structures. While this is true, it overlooks the fact that raising taxation revenue can also introduce distortions into the economy as a whole – for example, by diluting incentives to work or to save, or by reducing consumer spending.

## **XI – Considerations**

The main problem with the Brazilian electricity social tariff is that it does not define the target-public, only sets specific criteria of eligibility, being presumed that those that fill those criteria are the target-public. The criteria - consumption, connection standard and social programs enrollment – do not get along with the social tariff general objectives, therefore such criteria do not necessarily reflect the household income.

An audit carried out by the Brazilian Court of Audit – TCU considered the monthly consumption criterion, based on the Brazilian Institute of Geography and Statistics – IBGE data, as inefficient. This audit proved that the monthly consumption has little relation with the household income. A similar analysis for the North American Atlantic coast was carried out by the Low-Income Home Energy Assistance Program - LIHEAP, ending up with the same conclusion as TCU. The studies revealed that the LIHEAP-recipient households consumption is always inferior to the one of the average consumer and the household size is the major explicative variable for consumption. The household income explained only 26 % of the total consumption.

The social programs criteria is also inadequate for the concession of the social tariff because some cities are not administrative prepared for its implementation, which implies that no family is benefited and that the programs eligibility quotas, excessively limited in some cities, allow only a few families to receive the benefits.

The available resources of the Energy Development Account (*CDE -- Conta de Desenvolvimento Energético*) are limited and must also cover the electrical network access universalization program and energy matrix diversification, among others. The efficient identification of the social tariff beneficiaries is of great importance due to the competition for the CDE resources. Moreover, it is necessary to re-examine the tariff discounts once the current values keep the same structure of the 1980's and 1990's.

The most widespread form of consumer utility subsidies is the quantity-target subsidy. This type of subsidy often takes the form of an increasing block tariff, whereby all consumers face higher unit prices in successive increments of consumption. The failure to set subsidy thresholds at subsistence levels of consumption and the tendency to subsidize all residential consumers is generally attributed to political influence in rate setting. General residential subsidies and large subsidized blocks are politically popular precisely because they offer subsidies to many households. Thus, although increasing block tariffs are often justified in policy discussions as ways to keep service affordable for the poor, there could be other underlying and contradictory objectives that would favor poorly targeted subsidies.

Quantity targeting is not the only mechanism to deliver consumption subsidies for utility services. Alternatives include geographic targeting, which attempts to identify low-income areas, and means testing, which evaluates the economic situation of individual households.

The goal of transfer mechanisms is to reduce poverty levels. Both benefit and beneficiary incidence are important determinants of how well any subsidy or transfer program will reduce poverty headcount. Subsidy models with high benefit targeting performance and low errors of exclusion have the best potential to reduce poverty because they deliver a large percentage of each subsidy monetary unit to poor households and because a large percentage of poor households receive the subsidy.

Low-income intervenors should advocate that regulators take into account low-income payment "externalities" in much the same fashion that they consider environmental externalities. Such externalities would include, for example, the adverse impact of inability-to-pay on customer health and safety, the impact that inability-to-pay has on promoting housing abandonment, and the impact that inability-to-pay has on causing homelessness. The unaffordability of energy, or looking at it another way, the inability-to-pay of some households, has the impact of creating a substantial threat to the health, safety and perhaps even life of the household. Households depend upon an uninterrupted and reliable supply of energy to heat their homes, to cook their food, to provide light, to pump water, to cool their milk, and to do the numerous other things that are done today through the use of utility-supplied energy.

Programs target to low income households are needed to reduce their energy expenditures on a sustained basis. A comprehensive set of energy efficiency and conservation programs needs to be developed immediately. It involves utility-financed energy efficiency programs targeted to the poor. This is true because low-income households tend not to participate in utility-financed conservation programs. Therefore, they do not benefit from the "system-wide" savings generated by energy efficiency measures. Low-income ratepayers are paying "their share" of the costs, but are systematically excluded from receiving "their share" of the benefits. As a result, when a utility uses ratepayer money to finance energy efficiency measures, there is a direct income transfer from low-income households to households with moderate and upper incomes. The income transfer is clearly going in the wrong direction.

The need for utility subsidies can be reduced by measures that reduce the cost of providing network services or that improve the ability of poor households to pay for service at a given cost. Costs can be reduced by improving operating and capital efficiency, raising revenue collection, and revising technical norms to allow the adoption of lower-cost service delivery systems. Affordability of utility services can be enhanced through modifications of utility commercial policies, such as more frequent billing or prepayment services. These reforms help reduce the cash flow difficulties that sometimes lie behind the inability of low-income households to pay for utility services, even without any reduction in tariffs.

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