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URBAN ENERGY SERVICES PROGRAM -- SUSTAINABLE MUNICIPAL ENERGY SERVICES

SLUM ELECTRIFICATION -- BRAZIL BACKGROUND REPORT

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Executive Summary

1.1 BACKGROUND

The U.S. Agency for International Development (USAID), in cooperation with the International Copper Association (ICA), has launched the Slum Electrification and Loss Reduction Program, a three-year program (which began in October 2005) on the theme of regularizing electricity services in slum areas. The primary objective is to develop, test and evaluate customized approaches to improve electricity access and normalize services in slum areas for wide-scale implementation. Program activities include developing and designing pilot projects with local stakeholders in India and Brazil to develop customized approaches that can be replicated in these and other countries.

1.2 SUMMARY

This report provides a summary background on Brazil's slum electrification context in support of identifying potential in-country partners and possibly other donors with the same interest to select local projects that can benefit from the USAID/ICA joint program. Covered in the report are some relevant economic and population data, energy sector structure and regulatory perspective, major initiative on slum electrification, and potential partners and opportunities. Nexant is the technical assistance provider for the Sustainable Municipal Energy Services (SMES) task order under which, technical assistance for this activity is provided.

1.3 CONCLUSION AND RECOMMENDATIONS FOR NEXT STEPS

Brazil appears to offer promising opportunities for the USAID/ICA slum electrification initiative. Most of the major Electricity Distribution Companies (Discos) are either privatized or are well-managed state companies, and their main interest in slum electrification revolves around technical and non-technical loss reduction. The present government aims to provide legal access to electricity for all poor urban and rural households by 2008, thus increasing their activities in slum electrification.

A number of distribution companies currently have program ideas that can be attractive to the USAID/ICA initiative. A few Discos have expressed interest through the submittal of proposals summarizing their project outlines.

Based on the demonstrated interest by the Brazilian Discos, it is highly recommended that USAID and the Nexant team initiate a face-to-face dialogue with entities that showed serious interests to discuss proposed project details, expectations, roles and responsibilities of the various partners, and to assess the risk associated with such projects. A country visit in early February 2006 is being planned.

2.1 RELEVANT ECONOMIC AND POPULATION INFORMATION

2.1.1 Economy

According to a recent OECD review of Brazil's economic performance, Brazil posted "anemic growth" in 2001-2002, followed by "stagnation" in 2003. But in 2004, the economy grew "briskly, well above market expectations. Unemployment remains high in Brazil's major cities, but the trend is downward and wages are on the rise after a period of stagnation in recent years. Social services have improved but social disparities still block the benefits of sustained growth from becoming equitably dispersed throughout the population. The distribution of income remains "stubbornly skewed" and social exclusion prevents vulnerable groups from acquiring labor market-relevant skills; contributing to high unemployment and income inequality. A high proportion of GDP is being spent on social programs, with pensions accounting for a higher share of GDP compared to the average OECD country, despite Brazil's younger population. Spending on means-tested programs such as income transfers for the care of children, and elderly/disabled persons, amounts to a relatively small share of public social spending, well below the OECD average.

2.1.2 Population

In Brazil, there were 52 million households in 2005, of which 80 % live in urban areas and 16 million (38%) are considered low-income. Eleven cities have populations over one million with Sao Paulo, Rio de Janeiro and Belo Horizonte topping the list (Appendix B – Cities and Distribution Companies Matrix).

According to a breakdown by the Brazilian Association of Electric Energy Distributors (ABRADEE) of non-payment by customer class, residential customers are only slightly worse in terms of non-payment than all classes except for government, which is dramatically worse than all the others (e.g., averaging around 25% non-payment vs. around 6% for residential). Disconnections by Discos have risen in concert with non-payment, reaching around 1.2 million monthly in all of Brazil. A greater proportion of low-income residential consumers pay their past due bills than higher income classes. Only about 1% of the low-income groups have their services disconnected.

2.2 ENERGY SECTOR STRUCTURE AND REGULATORY FRAMEWORK

2.2.1 Infrastructure

Electricity generation in Brazil is predominantly hydro-based (around 90% of generation in a typical year or 80% of installed capacity) with the majority of the remaining sources are thermal-based, and a very small percentage of renewable energy (non-hydro). Except

in times of drought, generation capacity is sufficient to meet electricity demand. After several years of stagnation because of drought and rationing-related conservation, electricity demand is again growing by 6-7% a year, leading to a requirement for about 6,000 MW of new capacity estimated at U.S. \$4 billion each year. However, the actual pace at which new plants are being built is not keeping up with demand growth, largely because investment is not forthcoming. Several formerly eager foreign companies have withdrawn from the Brazilian market because of uncertainties in the direction of government policies and regulation and the strength of the economy. After the drought of 2001, the new government prioritized investment in new generation. Under the new policy, large new hydroelectric plants will again dominate¹.

The national electricity transmission grid is highly interconnected; although some remote areas still have independent grids (mostly fueled by diesel) and many remote small land owners and native peoples do not have access to conventional supply of electricity. Most of the load is in the more industrialized southeast while most of the hydroelectric capacity is located in the north and northeast. Therefore, some congestion still occurs but is being corrected with the installation of additional transmission capacity. Many of the new power plants will also need major new transmission lines to reach load locations.

2.2.2 Sector Operation and Regulation

In the 1990s, system operations were removed from government control by the Ministry of Mines and Energy (MME or Ministério de Minas e Energia) and Eletrobras, and the functions broken up and placed under a number of new entities. Eletrobras has become the holding company for the largest government-owned generating companies, e.g., Furnas, Eletrosul, Chesf, and Eletronorte. MME now operates specific programs and is responsible for proposing, supervising and controlling energy policies. New entities include:

- Electric System National Operator (ONS), a private company that now carries out coordination and control activities of the electricity generation and transmission operations, in the interconnected systems (Sistema Interligado Nacional or SIN).
- The wholesale market for electric energy (MAE or Mercado Atacadista de Energia Elétrica).

The Brazilian Electric Power Agency (Agência Nacional de Energia Elétrica or ANEEL) is the regulatory agency with direct oversight of electricity distribution. It was created in 1996, by law, but only implemented at the end of 1998 to replace its predecessor, the National Department of Water and Electricity (DNAEE). Its responsibilities include:

- Establishing and providing oversight of regulated tariffs as well as bulk power market prices;

¹ There is still a huge potential for large new hydroelectric plants, often in excess of 1,000 MW each, which will be economically competitive to thermal options.

- Implementing GOB guidelines and policies for the sector including the concession contracts and the quality of customer service;
- Promoting bidding processes for hydro-power plant concessions and defining the best uses for hydropower potential in Brazil;
- Resolving conflicts among the existing agents;
- Approving transmission charges for the national transmission grid;
- Promoting of competitive markets; and
- Establishing adequate industry technical and operating standards.

The concession contracts with distribution companies were negotiated at various times in the last decade as they were sold and/or privatized. These contracts govern the tariffs that can be charged to retail consumers. ANEEL also administers the so-called 1% fund for energy efficiency (see Section 2).

With the objective of improving system security and attracting investment in the sector after major market disruptions caused by the drought and the government's reaction to it in 2001, in March of 2004, Law # 10 848 made additional changes in the sector affecting conditions under which electricity can be sold, by whom and to whom and requiring separation of the generation, transmission and distribution functions. It also created:

- a new entity, the Energy Research Agency (EPE or Empresa de Pesquisa Energética) is charged with conducting planning studies related to the expansion of generation, transmission and presenting them to ANEEL,
- the Committee for Monitoring the Electric System (CSME) monitors and evaluates reliability and security of the national electricity system, and
- the Office of Electricity Energy Marketing (Câmara de Comercialização de Energia Elétrica or CCEE) oversees wholesale market transactions.

The non-government market entities under the sector framework include: concessionaires for distribution of electricity, "permissionaires" (i.e., outsourced or subcontracted concessionaire activities in some regions) such as cooperatives; concessionaires for generation or independent producers, auto-producers, marketers, and free or captive consumers.

2.2.3 Privatization

Privatization of electric companies in Brazil began in 1996 after adjusting existing legislation to permit foreign ownership of utilities and the sector's new operating model design was approved. ESCELSA in Espirito Santo was the first to be formally reorganized (i.e., unbundling most of its generating as well as transmission assets from its distribution/retail assets) and privatized. It was followed by LIGHT in Rio de Janeiro in 1996, by Eletropaulo in Sao Paulo state in 1997 and COELBA in Bahia in 1998. It was not until later, however, that most of the market reorganization plan and regulatory changes were implemented to create the supporting sector structure foreseen under the sector reform program. Currently, about 40% of the nation's distribution assets and 60% of its generating assets remain under government control.

2.2.4 Electricity Distribution

In the Brazilian electricity distribution market there are around 64 distribution companies (Discos) categorized as both private and government-owned. As shown in the Matrix, almost all of the major Discos comprise a mixture of government and private ownership. The government ownership may be federal, state or municipal, depending on the specific circumstances at the time of sector reform. The private concessionaires are controlled variously, e.g., by diverse Brazilian, North American, and European companies.

Seventeen Discos have more than a million urban and rural residential customers. These concessionaires furnish electricity to around 47 million consumers (residential 85%, governmental, commercial, and industrial). The companies associated with large municipal areas are listed in the Matrix.

The Brazilian Association of Electric Energy Distributors (Associação Brasileira de Distribuidores de Energia Elétrica or ABRADÉE) was formed in the late 1990s. It represents 51 electricity distribution concessionaires, both government owned and private in all regions of the country, representing 99% of the electricity market. Its mission is to assist its members to achieve “excellence in operational and economic/financial performance.”

As a result of the economic and financial problems caused by the drought and the government’s and consumers’ reactions to it², the distribution sector was in some disarray in the three years post-drought. Some foreign companies actually exited the market, such as PPL which wrote off its investment in CEMAR in 2003. AES defaulted in 2003 on its loan from the Brazilian development bank, BNDES, which lent money to AES to buy Brazilian assets, such as the Disco, Eletropaulo, in 2003. However, the Brazilian government chose to minimize disruption to this sector and CEMAR was taken over in 2004 by Brazilian investors while BNDES took a 49% stake in Eletropaulo in exchange for renegotiation of AES’s debt. LIGHT was up for sale at the time of this report.

2.2.5 Tariffs

In preparation for privatization, tariffs were raised starting in 1994 to cross subsidize the industrial, commercial and rural consumers. Residential tariffs became some of the

² First, power rationing at both the utility and the consumer level was introduced in 2001 after a prolonged drought resulted in a deficit of electric generating capacity. This rationing program caused very significant and sustained reduction in electricity consumption due to energy conservation measures successfully adapted by consumers that effectively reduced national consumption by 20%, the government’s overall rationing goal, mainly by reducing demand. During this period, skyrocketing wholesale power purchase prices coupled with stringent regulatory control on customer tariffs considerably reduced or eliminated profits in the sector – though in the post-crisis period, some regulatory decisions and other governmental actions were taken to restore the financial health of the most critically affected utilities. The crisis also caused a shift of many major commercial and industrial consumers to self-generation, thus leaving utilities without several key quality customers when the crisis was over, slack demand due to new attitudes on energy conservation, a persistently sluggish economy (1% growth in GDP in 2003) and few alternatives to quickly recapture losses or even previous revenue levels.

highest in the world. Not coincidentally, starting in 1994, non-payment of electric bills began to rise dramatically. By the 2001 power shortage crisis, non-payment by small users had reached 3.5 times their 1994 level, and spiked dramatically (to almost 6 times the base), falling back to somewhat over 4 times by 2004.

Tariff adjustments are determined separately for each concessionaire. Tariffs (and tariff increases) are proposed to, adjusted and approved by ANEEL both annually if requested by a Disco and every four years regardless. Tariffs in general remain very high compared to many other countries, especially those such as Canada with a comparable amount hydroelectric generation in its mix. However, it should be noted that the tariff is a more than 30% tax, a significantly larger percentage than imposed in most other countries.

Low-income residential customers come under the “Group B” and are designated as B1 for tariff purposes. As of 2002, this “social” tariff scheme for the B1 group provides those qualifying with a large discount on the order of 65% for the first 30 kWh, 40% for 31-80 kWh, and 10% from 81 to an upper limit varying by region. The average monthly bill for low-income customer is around R10 (U.S. \$4).

However, ANEEL is working on eliminating cross subsidies by 2007. For example, from CEMIG’s expected tariff impact analysis, it appears that its tariffs are all going up but more so for the industrial customers than for residential, i.e., 25% and 19% respectively.

2.2.6 Municipal Authorities and Responsibilities

Municipal authorities and responsibilities are quite fractionated in Brazil. For example, there are seven municipal administrations that constitute metropolitan São Paulo. As a consequence, distribution concessions tend to cover quite a number of jurisdictions. For another example the CEMIG Disco serves 774 municipalities and 5415 localities in Minas Gerais state (MG) and a population of approximately 17 million persons.

3.1 NATIONAL INITIATIVES

In the late 1990s, ANEEL created the industry-wide “energy efficiency improvement fund”, to be utilized for demand-side efficiency activities (of which approximately 50% was earmarked for R&D initiatives and the rest could be used for programmatic purposes). Utilities’ concessionaire contracts contain provisions to access this fund, which amounts to 1% of the utility’s gross revenue for use in their own territory. The use of these funds for slum electrification initiatives (e.g., reconnection and metering) has varied, depending on the policy direction of ANEEL and the national government. At first, slum electrification was considered eligible for activities using this fund as they enabled customers to understand and monitor their own energy consumption and the Discos were permitted to use some of these funds to undertake such programs. Between 2002 and the present however, ANEEL restricted the use of financial resources from the efficiency fund for urban electrification to only utilities in the North and Northeast -- the poorest regions of Brazil – with the justification that the better off regions did not need such assistance.

The approval in April 2002 of electricity sector Law No. 10.438 gave a clear signal to utilities on how the government was focusing on meeting the service needs of lower income citizens and those with poor access to electricity service. The Law formally mandates that utilities must achieve 100% electricity coverage in their respective service areas by dates established for each utility. As a result, utilities faced increased service obligations for a segment of customers with little or no return value on investment in the near to mid-term.

Government subsidies were expected to significantly support the costs of providing service for this segment of the population. Since President Lula’s administration began in January 2003, there has been even more emphasis on equal quality of electricity service for all and access to public services for marginalized economic groups through direct and indirect subsidy programs and stronger enforcement of contractual and legal obligations to provide service and emphasis on acts of social responsibility by corporations and citizens.

In December 2005, ANEEL issued revisions to the rules on the use of this fund indicating a focus on loss reduction and access to electricity for poor consumers and allowing all concessionaires to once again be allowed to use the fund for slum electrification related activities throughout the country. According to Alexandre Mancuso of USAID Brazil, the new General Director for ANEEL, Jerson Kelman, is very interested in having utilities invest in reducing commercial losses, particularly installing meters and distribution systems in urban and peri-urban areas. This interest is obviously being

manifested in the reversal of restrictions that had been in place on using the fund's resources in slum areas.

A number of other nationally controlled sources of funding might be directed to slum electrification initiatives. During the late 1990s, the government continued to permit use of the RGR, a general sector fund financed by a fee on all electricity customers, for subsidizing rural electrification and special rates for very low-income consumers. The resources of the CDE fund³ (established in 2002 to eventually replace the existing RGR fund) are being aggressively funneled for urban and rural electrification purposes, as well as for low-income consumer subsidies.

Finally, ANEEL instituted a cap on losses (i.e., a limit on recovery of losses through ratepayers of 90.7 % of actual losses), which is expected to encourage utilities to increase their efforts to reduce technical and non-technical (commercial theft) losses.

3.2 DISTRIBUTION COMPANIES' INITIATIVES

In the immediate aftermath of their privatization, Brazilian utilities undertook slum electrification/regularization programs, mainly aiming at the reduction of costly non-technical losses and, to a more limited extent, because they were permitted to use the 1% efficiency fund.

Investigation of distribution company initiatives has uncovered the following:

COELBA: Community Agent program regularizes connections and provides energy efficiency assistance to households in favelas. Around 400,000 households have been regularized. See **Annex A** for program description.

AMPLA: The core of the AMPLA program is a high technology anti-theft and remote meter reading system augmented by educational activities aimed at helping households in favelas to rationalize energy use. See **Annex A** for program description.

LIGHT: Since 2000, LIGHT has been operating a program called Comunidade Eficiente, which has proven effective and has already reached 120,000 households. The program includes new connections, improvement to the distribution system and community "electricians." See **Annex A** for program description.

CEMIG Distribuicao (CEMIG D): It has implemented a program, "Clarear" (translating to "to light up"), to legally electrify urban and peri-urban areas in the state of Minas Gerais, particularly around Belo Horizonte (third largest city in Brazil) and Ouro Preto.

³ The Energy Development Account (Conta de Desenvolvimento Energético – "CDE") was created by Law No. 10.438 as a fund aimed at fostering the energy development of the Brazilian States and the competitiveness of alternative energy projects, natural gas fueled power stations and Brazilian coal fueled power stations in the locations served by the Brazilian Electric Interconnected System, and making the energy services generally available to all people throughout the Brazilian territory (the so-called universalization of the services). The CDE will be regulated by the Brazilian government and administered by Eletrobras, and will exist for 25 years.

IDB is lending \$ 10 million out of a total program cost of almost \$ 19 million in funds to expand distribution infrastructure that will serve both urban households (3000) via the “Clarear” program and rural households and small producers (10,000) via Luz para Todos program as well as large rural agricultural producers (500) without any subsidy going to them. Working through the two programs will allow qualified consumers to access the subsidies allotted to the two classes of low income consumers through the respective programs, which will lower the cost of connection to the grid and prepare the households for receiving electricity. The fixed subsidy is going directly to CEMIG D but is conditioned on consumers actually getting connected (OBA style).

Eletropaulo: Eletropaulo is conducting educational projects similar to LIGHT’s Comunidade Eficiente including furnishing the meter and new connection for clandestine customers as well as household internal improvements including refrigerators.

3.3 COMBINED INITIATIVES

ANEEL, LIGHT and AMPLA are working with training institutions to provide training courses that prepare police forces to help in the identification and prosecution of theft of electricity and electrical equipment such as cables.

3.4 NGO INITIATIVES

Winrock/Brazil has been working with DFID providing research assistance in two impoverished communities (Plataforma and Canabrava) in Salvador, Bahia, Brazil. They held a national workshop on the topic. According to Winrock, the final report will be available very shortly.

AVSI: An Italian NGO that has been very active in setting up slum electrification projects, first, in Rio de Janeiro and later in Salvador, Bahia.

3.5 STATE INITIATIVES

Concessionaire contracts have clauses allowing them to cut supply in case of non-payment. However, consumer protection initiatives are attempting to limit the ability of distribution companies to cut off supply of electricity to consumers who do not pay their electricity bills. The outcomes are playing out in various state level courts and have been contradictory. In early 2005 a judge in RG state ruled for AES Sul while another in SP state ruled against Elektro for similar situations.

3.6 DONOR INITIATIVES

Donors active in Brazil on urban issues include: World Bank, IDB, USAID and DFID. The following have some potential relevance to slum electrification.

World Bank: The Bank has numerous initiatives related to urban upgrading and infrastructure development but none specifically targeted toward electrification. For

example, its Programmatic Loan for Sustainable and Equitable Growth: Housing Sector Reform aims to improve the policy environment for improving the living conditions of the poor and strengthening their access to assets, notably housing and serviced/serviceable land.

Inter-American Development Bank (IDB). In its Brazil strategy for 2004-7, IDB targets electrification of remote and low-income households consistent with the national government goal for universal electricity service by the end of the decade. IDB provides loans for distribution infrastructure (see example of CEMIG below) to both government-owned and privately owned companies through its different lending facilities. Furthermore it has a number of “trust funds” that provide grants (usually with significant matching funds required) for technical assistance (usually associated with the preparation for a loan). Its Multilateral Investment Fund (MIF) likewise provides technical assistance funds for environmentally oriented projects (including energy efficiency initiatives). IDB is also a GEF implementing agency.

An IDB Technical Assistance for Urban Development Project (\$150,000, approved 2/15/05). This technical cooperation aimed at the reduction of the urban poverty by improving the efficiency of large local investments. This will be achieved by: “(i) major coordination between the different partners in the sector; (ii) identification of programs or projects in which the Bank can have an important added value; and (iii) assisting the transference of methodologies and instruments of intervention for the local partners target to improve the planning and management of urban projects.”

Cities Alliance: Brazil is an active member of Cities Alliance, which is housed in the World Bank.

As a result of the contacts made with potential local partners and the explanation of the USAID/ICA Slum Electrification initiative, the following opportunities have been proposed informally by distribution utilities in Brazil:

COELBA (Companhia de Eletricidade do Estado da Bahia): (Urban prepayment pilot). This pilot would provide pre-payment meters in a low-income urban area that is already electrified legally (and with interior wiring already redone) but where some customers are reverting back to theft, and where COELBA is also implementing remote meter reading. Two such areas are Ilha de Tinhare and a neighborhood in Salvador. Prepayment meters could be offered to those unable to pay their bills (to avoid disconnection) and others who wish to have them. The motivation to move to prepayment would be an offer to provide a Procel-seal efficient refrigerator. If the pilot is successful, there are 1.7 M customers classified as low income that might benefit from expansion of the successful pilot to other areas within Coelba's service territory. For this pilot, funds required include purchase of the software associated with prepayment meters (around R\$ 600,000 or \$240,000). Remote meters for 4,520 customers will cost Coelba R\$ 1.82 M.

LIGHT: Light is proposing a "high profile" pilot project in Rio das Pedras, in the Jacarepagá neighbourhood, which is the chosen site of the Pan American games to be held in 7/07. Government support is being committed to upgrade the area but not for electricity. In a three year program, LIGHT proposes to use a basket of measures to regularize access to electricity in the slum, including its community agents approach, the addition of two customer service offices, educational activities, and progressive rewards for continued regular payment. The hardware required includes distribution line extensions and meters. The total cost is R\$ 8.4 M. It is important to factor in the decision to work with LIGHT the fact that the company might be sold in the near future.

Eletropaulo: The company has proposed a program with a scope of approximately 450,000 illegal connections on the periphery of SP and another 23 cities around SP within their concession area where every year 20,000 new illegal connections are added. The losses from this amount to 1,800 GWh/year or \$US200M per year. AES wants to stop the losses. ANEEL's recent change in the use of the 1% fund for slum electrification makes it more attractive to them to do so. They propose the following actions:

- Limited distribution system expansion as necessary and replacement of "open" cable with "anti-theft" cable in the secondary distribution system. Approximately \$US120/customer.
- Developing relationships with community leaders to negotiate conditions under which regularization would take place.
- Community education campaign prior to regularization
- Energy efficiency improvements
 - o Meters (\$US62/customer)
 - o Internal wiring (\$US60)

- o 3 free fluorescent light bulbs (\$US10/customer)
 - o Retrofitting or replacing inefficient refrigerators (\$US140/customer)
 - o Public lighting (\$US154 per post)
- Assistance with control of energy consumption and bill payment, including negotiation of past due payments.

CEMIG (Companhia Energética de Minas Gerais): *CEMIG*, located in Belo Horizonte but serving the entire state of Minas Gerais, has developed the “Clarear” program to provide 100% access to electricity in the cities in its service territory in parallel to the government mandated Luz para Todos program for rural areas. Connections would be provided to about 38,000 new consumers by 2010 in 370 of the 774 cities covered by CEMIG. This will require investments of approximately R\$ 48.5 million (\$20 million). The necessary funds will come from CEMIG’s own cashflow although the recipients will pay for the meter and service drop to their residences. The program is applicable for consumers with up to 50 kW of load. The lead for this initiative was Ricardo Pinheiro of IDB. **So far, the person responsible for “Clarear” has not responded to emails asking about interest in the USAID/ICA initiative.**

AMPLA, also serving Rio and having 380,000 residential customers needing regularization, proposes to apply its two pronged approach to a new pilot area. The two prongs are 1) high technology anti-theft and remote meter reading system augmented by educational activities aimed at helping households in favelas to rationalize energy use and 2) its present pilot project in Sao Goncalves area for 35,000 households which uses new technology installed in the line to incapacitate appliances in the home if the meter is bypassed.

Mr. José Gabino of ABRADÉE is cooperating with the Nexant team to get out the word on the USAID/ICA opportunity but so far has not brought in any additional initiatives. Nexant requested that efforts should be exerted to include CEB (Brasilia), CPFL (part of Sao Paulo), and CEMIG.

IIEC has submitted to Nexant a proposal that was then forwarded to USAID proposing energy efficiency activities in poor areas (“favelas”) of Rio state.

5.1 CONCLUSION

The Brazilian economy is relatively stable and growing. So-called “invasions” by poor people migrating from rural areas are nevertheless continuing; although some of the hardest hit in the past, e.g., Sao Paulo and Rio, seem to be saturated and migrants are heading to somewhat smaller cities (like Curitiba). Most of the major Discos are either privatized or are very well run state companies.

The disruptions earlier in the decade caused by sector restructuring and rationing have largely worked their way through the sector, and most companies are actually making profits (though many still have large overhanging debts, including LIGHT). Technical and non-technical loss reduction programs (including non-payment) of the Discos are continuing apace. The present government has put instituted a number of incentives that are motivating distribution companies to provide legal access to electricity for poor urban and rural households, thus increasing Discos’ activities in the slums.

Several Discos, notably COELBA and AMPLA, have found effective means to deal with the problems associated with electrifying slums and with non-payment by poor slum consumers. These means are somewhat overlapping but differ in emphasis: i.e., COELBA on community presence and assistance with energy efficiency and AMPLA on installation of high-tech anti-theft equipment. A number of the Disco serving large metropolitan areas have shown interest in participating in the USAID program; although the detail provided in their “proposals” differs greatly. The ones that are expected to be interested have either not responded or focusing their attention to the matter need more efforts.

5.2 RECOMMENDATIONS

- Continue to encourage local Discos that have shown interest to develop project ideas to a level that can be judged for merits and compatibility with the objectives of the USAID/ICA program.
- Continue to contact the likely candidates to raise their understanding of the opportunity to determine a “go” or “no go” decision.
- Prepare for a country visit in early February to initiate face-to-face dialogue with organizations and individuals to investigate and screen the current leads. A pre-scoping mission should be planned and an itinerary be prepared.

Rio de Janeiro, Brazil**LIGHT Program description**

After purchase of the state-owned distribution company LIGHT (partially owned by EDF) launched the PRONAI or Program for Normalization of Informal Areas as a demonstration of how intense interaction with the community through a strong community-based set of “LIGHT agents” (contracted through a local NGO) could literally open up the slums and change people’s attitudes toward paying for electricity. Components included:

- ⇒ Improving quality of service and reducing associated safety hazards through upgrading networks and connections
- ⇒ Extensive reconstruction of the distribution systems within the slums
- ⇒ Making formal grid connection and legal purchase of electricity affordable and desirable through subsidies and financing
- ⇒ Strong economic incentives for participation, including amnesty from prior electricity debts and fines for theft and disconnection and subsidized connection fees with easy payment terms
- ⇒ Free efficient light bulbs were distributed in 2000 and 2001 and lowered the level of electricity consumption for participants
- ⇒ Ease of payment was also improved with customer service offices added in many areas more convenient to community circulation patterns.
- ⇒ Documentation of proof of residence for favela residents, which is necessary for getting a phone installed and establishing credit and is a highly valued benefit.

Achievements: PRONAI regularized or connected for the first time over 250,000 households in favelas (slums)

Duration of the program: Program halted in 2003 and was being revamped, drawing on the best aspects of its experience with PRONAI and fixing others.

Financing: Self-financing (through a loan guaranteed by MIGA/IFC) meant approval by the company’s management as well as the newly instituted Brazilian electricity regulator.

Sources of information/contact information:

- ⇒ Information gathered in site visit to city, late 2003

CERJ/AMPLA**Program description**

AMPLA is installing 300,000 meters of this type, combined with the shielded networks (DAT), covering 100% of their non manageable zones (favelas). They have already tried a pilot with 60,000 consumers living in "favelas" and losses were sustainably reduced from 55 to 9%. They could not eliminate all non-technical losses because only recently (since May 30, 2005) the Electricity Regulator ANEEL began allowing remote electronic metering. This fact obliged them to keep non shielded meters at the customers' houses and the 9% losses were due to theft at those points. At present, they are implementing remote metering + DAT to all the 300,000 customers living in areas where they have high losses.

Sources of information/contact information:

Pedro Antmann, consultant working with AMPLA on reducing non-technical losses
Acacio Baretto, AMPLA, presentation at workshop 9/05

Salvador, Bahia, Brazil**Program description**

A utility-led (COELBA) effort to regularize electricity connections in the city's slums (stop theft, reconnect disconnected customers, extend electrical connections to slums not already electrified). The program uses community "agents" contracted through a local NGO to represent the company and provide distribution services in the slums. It also has a strong energy efficiency component to help households stay within their "affordability limits."

Achievements:

- ⇒ upwards of 300,000 households connected or regularized
- ⇒ collections up by 50%
- ⇒ losses due to theft reduced by 50%

Duration of the program: started in 2002 and still ongoing

Financing:

- ⇒ The ½% of overall annual revenues required by regulator to be used for energy efficiency programs is being directed to the efficiency component of this program.
- ⇒ Otherwise investments funded by utility

Sources of information/contact information:

- ⇒ 2003 case study site visit by USAID team (published in Slum Electrification report)
- ⇒ COELBA presentation at 9/05 workshop

Appendix B

Cities and Distribution Companies Matrix

Major Cities in Brazil with Population over One Million and their respective Distribution Companies

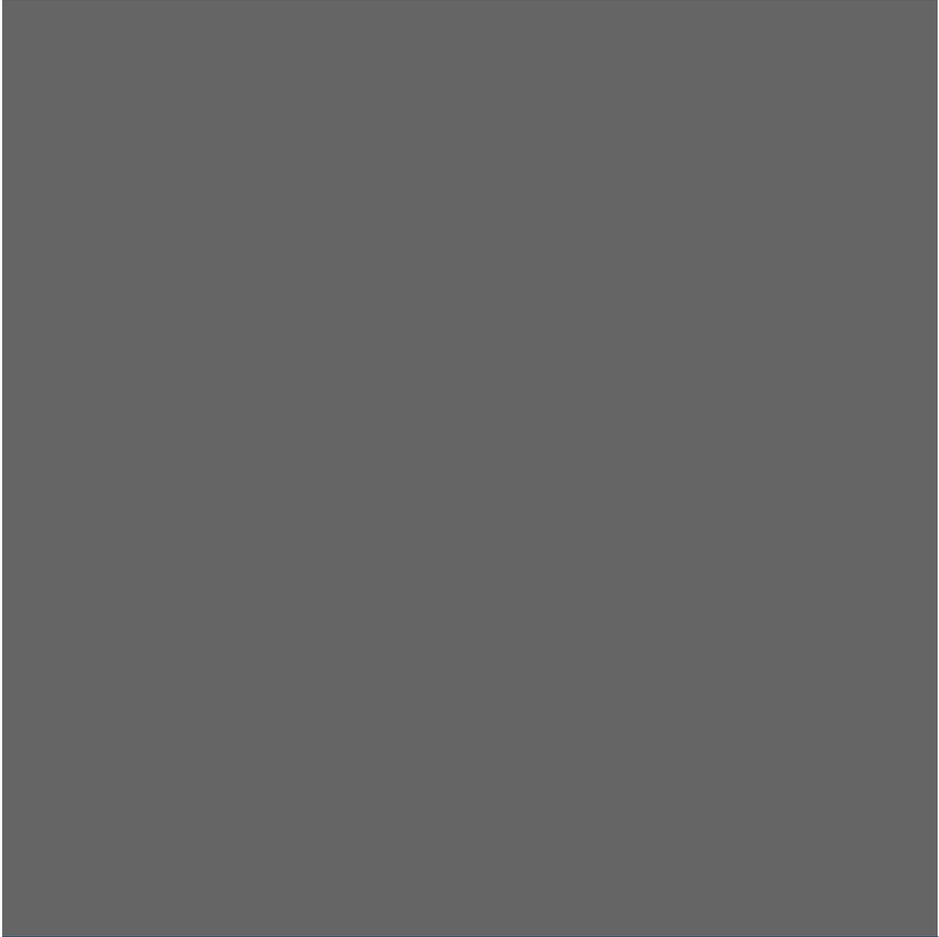
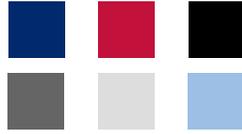
Major City, State	Population in major city (000)	% low income in state	Distribution Company(ies)	# Res customers (000)	Private (date, % sold)/Public ownership	Degree of problem	Program underway? Comments
São Paulo, SP	18 333	25%	Eletropaulo	4 700	Private (98, 75%)	Large	?
			Bandeirante	1 200	Private (98, 75%)	Large	?
			CPFL	2 700	Private (97, 58%)	Large	?
			Elektro	1 600	Private (98, 47%)	Moderate	
Baixada Santista (Santos) SP	1 634		Bandeirante	Included above	See above	Large	?
Rio de Janeiro, RJ	11 469	28%	LIGHT	3 200	Private (96, 51%)	Large	Yes but recidivism
			AMPLA	1 800	Private (96, 70%)	Reduced	Yes, urban areas less than half done
Belo Horizonte, MG	5 304	46%	CEMIG	4 800	State	Large	Yes (Clarear)
Pôrto Alegre, RS	3 795	24%	CEEE	1 100	State	Moderate	?
			RGE	<1 000	Private	Moderate	?
			AES Sul	<1 000	Private (97, 91%)	Moderate	?
Recife, PE	3 527	59%	CELPE	2 000	Private (00, 80%)	Large	? Part of Neoenergia Group
Brasília, DF	3 341	53%	CEB	<1 000	State (well run)	Large	?
Salvador, BA	3 331	63%	COELBA	3 000	Private	Mostly eliminated	Yes; Agente COELBA Pilot proposed Part of Neoenergia Group
Fortaleza, CE	3 261	65%	COELCE	1 900	Private	Large	As part of loss reduction prog
Curitiba, PA	2 871		COPEL*	2 500	State	Moderate but recent new invasions	? Said to be very well run
Belém, Para	2 097		CELPA	1 100	Private (98, 55%)	Moderate	?
Goiânia, GO	1 878	35%	CELG	1 600	State	Moderate	?
Manaus, AM	1 673	70%	Manaus	<.500	State	Moderate	?
Grande Vitória, ES	1 602	35%	ESCELSA	<1 000	Private (95, 50%)	Possibly Large	?
Maceió, AL	1 137		CEAL	<1 000	State	Large	?
Natal, RN	1 049	61%	COSERN	<1 000	Private (97, 78%)	?	? Part of Neoenergia Group

Appendix C

List of Key Contacts

Organization	Person(s)
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ABRADEE Rua da Assembléia, 10 Grupo 3201 BR-20011-901 RIO DE JANEIRO - RJ Brazil	Mr. Luis Carlos SILVEIRA GUIMARAES President of ABRADDEE Tel: +55 21 2531 2053 Fax: +55 21 2535 2595 abradee@abradee.org.br
USAID Brazil Embassy of the U.S.A. SES Q 801 Lote 3 70.403-900 Brasilia – DF, Brazil	Mr. Alexandre Mancuso, Sr. Energy Advisor (61) 3312-7246 (61) 3312-7648 (fax)

ABRADEE	ASSOCIAÇÃO BRASILEIRA DE DISTRIBUIDORES DE ENERGIA ELÉTRICA
AES Sul	AES SUL DISTRIBUIDORA GAÚCHA DE ENERGIA S.A.
AMPLA	COMPANHIA DE ELETRICIDADE DO RIO DE JANEIRO
ANEEL	AGÊNCIA NACIONAL DE ENERGIA ELÉTRICA
BANDEIRANTE	BANDEIRANTE ENERGIA S.A.
CCEE	CÂMARA DE COMERCIALIZACIÓN DE ENERGIA ELÉTRICA
CDE	CONTA DE DESENVOLVIMENTO ENERGÉTICO
CEAL	COMPANHIA ENERGÉTICA DE ALAGOAS
CEB	COMPANHIA ENERGÉTICA DE BRASÍLIA
CEEE	COMPANHIA ESTADUAL DE ENERGIA ELÉTRICA
CELG	COMPANHIA ENERGÉTICA DE GOIÁS
CELPA	CENTRAIS ELÉTRICAS DO PARÁ S.A
CELPE	COMPANHIA ENERGÉTICA DE PERNAMBUCO
CEMIG	COMPANHIA ENERGÉTICA DE MINAS GERAIS
CHESF	COMPANHIA HIDRO ELÉTRICA DO SÃO FRANCISCO
CPFL	COMPANHIA PAULISTA DE FORÇA E LUZ
COELBA	COMPANHIA DE ELETRICIDADE DO ESTADO DA BAHIA
COELCE	COMPANHIA ENERGÉTICA DO CEARÁ
COPEL	COMPANHIA PARANAENSE DE ENERGIA
COSERN	COMPANHIA ENERGÉTICA DO RIO GRANDE DO NORTE
CSME	COMMITTEE FOR MONITORING THE ELECTRIC SYSTEM
ELEKTRO	ELEKTRO ELETRICIDADE E SERVIÇOS S.A.
ELETROBRAS	CENTRAIS ELÉTRICAS BRASILEIRAS SA
ELETORNORTE	CENTRAIS ELÉTRICAS DO NORTE DO BRASIL SA
ELETROPAULO	ELETROPAULO METROPOLITANA ELETRICIDADE DE SÃO PAULO, SA.
ELETROSUL	CENTRAIS ELETRICAS DO SUL DO BRASIL S.A.
EPE	EMPRESA DE PESQUISA ENERGÉTICA
ESCELSA	ESPÍRITO SANTO CENTRAIS ELÉTRICAS S.A.
FURNAS	FURNAS CENTRAIS ELÉTRICAS S.A.
LIGHT	LIGHT SERVIÇOS DE ELETRICIDADE S.A.
MANAUS	MANAUS ENERGIA S.A
MME	MINISTÉRIO DE MINAS E ENERGIA
ONS	ELECTRIC SYSTEM NATIONAL OPERATOR
RGE	RIO GRANDE ENERGIA S.A



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