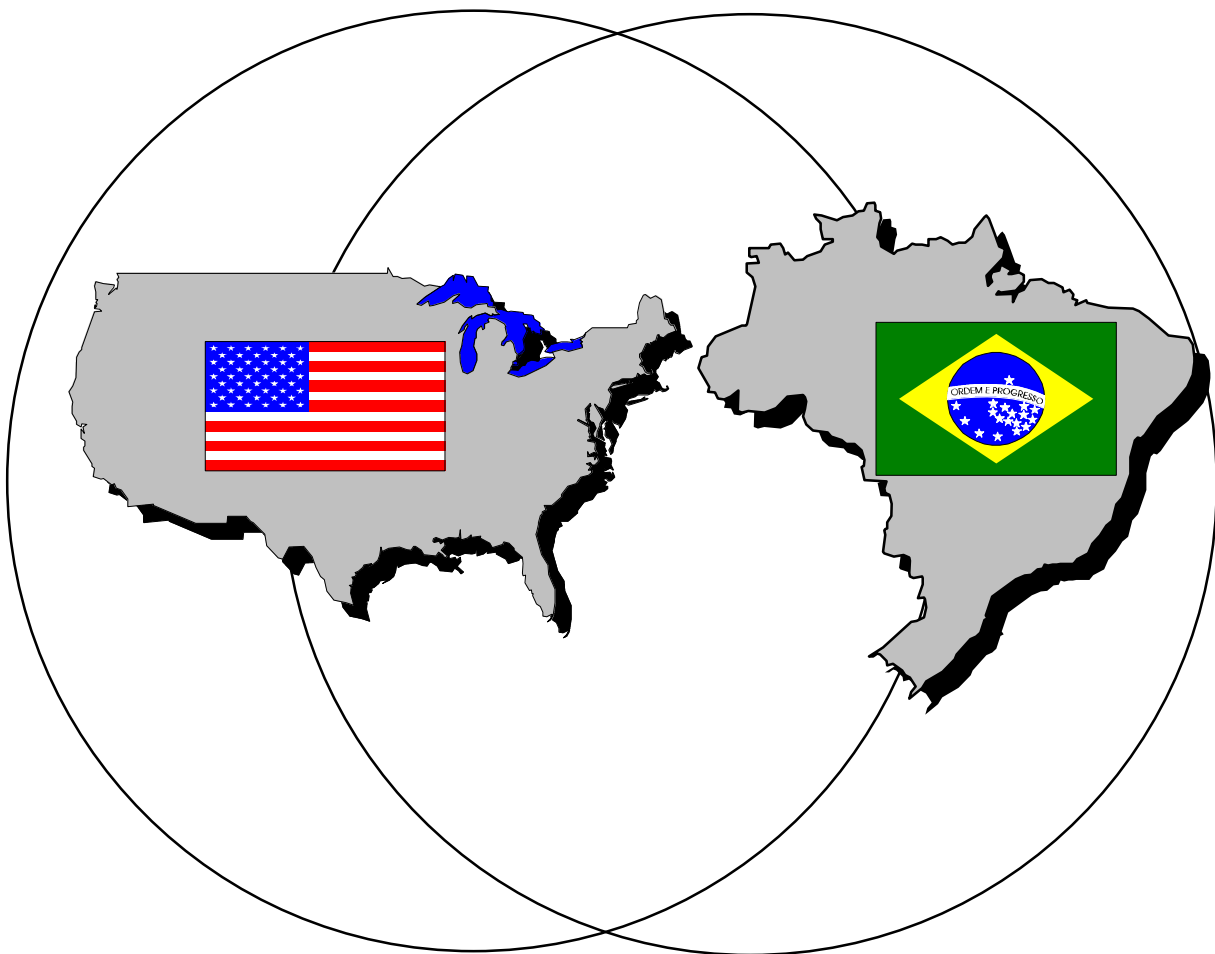


USAID/Brazil Strategic Objective 2 Energy Program



**Final Version
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SO 2. Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use

A. Linkage to Agency Goals and Objectives

The USAID/Brazil Clean and Efficient Energy strategic objective (SO2), “**Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use,**” directly supports the Agency Environment Strategic Framework (Agency Goal 5). The Agency Goal, Objectives and Program Approaches addressed by SO2 are as follows:

USAID Goal 5: The world's environment protected for long-term sustainability

USAID Objectives:

5.1 Threat of global climate change reduced

Program Approaches:

5.1.1 Greenhouse gas emissions decreased

5.4 Use of environmentally sound energy services increased

Program Approaches:

5.4.1 Provision of energy services by the private sector increased

5.4.2 Higher levels of energy efficiency achieved

5.4.3 Use of renewable energy increased

5.4.4 Use of clean technologies increased

Brazil is currently the largest emitter of greenhouse gases (GHGs) in Latin America. In 1991, Brazil was the fifth largest net GHG emitter worldwide. In the five-year period between 1991 and 1995, industrial carbon dioxide emissions in Brazil increased by 20 percent. Given the continuing growth and structural changes in Brazil's economy, it is likely that carbon dioxide emissions will continue to increase at a strong pace. The USAID/Brazil Clean and Efficient Energy SO addresses the issue of potential growth in GHG emissions as Brazil's economy expands and outgrows its current clean energy base.

In addition, Brazil has been identified as a key country in USAID's Developing Country Climate Change Action Plan, not only because of its contribution to net global GHG emissions, but also due to a number of other factors that favor cost effective actions to reduce the GHG emissions growth rate. Specifically, Brazil: (i) is the largest and fastest growing Latin American economy, with significant potential for increasing current GHG emissions; (ii) has abundant resources for sustainable energy production and use, particularly for biomass fuels, solar energy, wind and small-scale hydropower potential; (iii) offers locally supported energy efficiency opportunities with attractive cost/benefit ratios; (iv) has the potential to foster replicable models for clean energy development in the region; and (v) continues to show a clear commitment to significant restructuring and privatization of its energy industry under a competitive environment, including policies conducive to clean and efficient energy options.

It should also be noted that the USAID/Brazil Clean and Efficient Energy SO supports five U.S. Government foreign policy initiatives:

- (I) The U.S./Brazil Common Agenda for the Environment, which articulates bilateral collaboration with respect to energy and environmental related issues;
- (ii) The Summit of the Americas Initiative, which promotes hemispheric collaboration on energy;
- (iii) The Framework Convention on Climate Change, which seeks to establish a global framework for collaboration on climate change;
- (iv) The U.S.- Brazil Implementing Arrangement for Cooperation in the Area of Energy Technology, signed during President Clinton's October 1997 visit to Brazil; and
- (v) The Activities Initiated Jointly (AIJ) and the Clean Development Mechanism (CDM) proposed by Brazil as part of the Kyoto Protocol.

B. Host Country Goals

Brazil's major goal in the power sector is to guarantee the availability and reliability of energy services to all citizens and economic activities, while converting from a largely state-controlled to a market-driven energy industry, regulated to allow for regional disparities that limit full access to electrical energy. In the next three years, the goal is to achieve a balance between attracting private investment to foster expansion needs and maintaining energy prices at a level that does not impede economic growth.

While emissions growth and global climate change considerations have not been of primary concern when expanding the power sector in Brazil, environmental precautions are taken into account when siting new generation facilities and transmission routes. Brazil perceives social exclusion of those cut off from energy services as more harmful to its development than the threat of global climate change. A similar rationale applies to Brazil's perception of energy efficiency. Energy efficiency policy and related goals are driven by the need to optimize resource allocation in an economy where capital stocks are scarce, and not necessarily by global climate change concerns.

These country goals were recently confirmed when the Brazilian Congress enacted legislation that earmarks 50 percent of a federal power investment fund (the Global Guarantee Reserve Fund, or RGR) to energy efficiency, rural electrification, and low income consumer support. Additionally, since mid-1997, following a USAID recommendation, licensing regulations were established in order to direct one percent of gross annual utility revenues to energy efficiency programs, estimated at \$198 million per year.

In the executive branch, country goals are affirmed by strong and continued political will to implement power sector reforms through administrative actions. This is especially true of those policies related to energy efficiency and expansion of rural and market-oriented energy services, all targets of the USAID/Brazil Clean and Efficient Energy SO.

With the Government of Brazil (GOB) poised to launch such significant restructuring and privatization of its energy sector, it is imperative that USAID take a leading role in shaping these changes. The Mission, by providing technical assistance to the various energy agencies and organizations, will be allowed a voice in the reform dialog with the GOB, as well as an opportunity to leverage significant amounts of funds. USAID's participation in the process will

also help to ensure a level playing field for trade in energy-related goods and services, allowing greater market access for U.S. businesses.

C. Strategic Objective

1. Statement of Strategic Objective

The USAID/Brazil strategic objective is: “Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use.” Four intermediate results support the achievement of the strategic objective:

- IR 2.1 Targeted policies promoted that foster clean and efficient energy production and use
- IR 2.2 Increased access of key actors to information on market-based mechanisms for operating and financing clean and efficient energy production and use
- IR 2.3 Increased availability and use of financing for clean and efficient energy production and use
- IR 2.4 Increased technology cooperation between U.S. and Brazilian firms for clean and efficient energy production and use

2. Problem Analysis

Restructuring and Privatization

Brazil is restructuring and privatizing its electric power sector, converting from a largely state controlled system to a market-driven model. The nature of the market model and the necessity of increasing overall economic efficiency are such that this market model will push toward higher efficiency in production and use of energy. Thus, Brazil's energy sector is in a transitional phase, in which policy development and implementation is critically time-sensitive. Although Brazil has created other regulatory bodies, there is no tradition of independent regulation to ensure quality, access, and fairness of energy services, or to enforce the rights and responsibilities of consumers and providers with regard to clean energy options. There is also room to improve the coordination of the nascent federal and state energy regulatory agencies with environmental entities.

At the same time that privatization is taking place and new regulatory structures are being implemented, the tradition of centralized planning is ending. The current Ten-year Plan of Eletrobrás, the national electric utility, is the latest edition of an annually updated document that served in the past to focus Eletrobrás' resources and those of its subsidiaries. Centralized government planning previously required that Eletrobrás organize, plan, finance, build, and operate the entire electric power system. Now, however, the Ten-Year Plan (*Plano 2015*) is only indicative of the course that overall system expansion may follow, not a plan for which Eletrobrás is directly responsible for the implementation. Rather, the new power sector market structure is shaped through privatization legislation and decisions of the new regulatory agencies and investment decisions of privatized utilities, Brazilian and foreign investors, development and commercial financing agents, and private power developers. Thus, decisions made in the past by

Eletrobrás as to what would be built and when are now being made by the private sector in a market subject to growing competition.

Brazil's Economic Growth

In addition to these major changes, at the present stage of development, the Brazilian economy exhibits a clear trend of increasing levels of energy intensity. Projected economic expansion of three percent per year and the corresponding growth in energy needs (e.g., electricity demand increased 6.5 percent in 1997) will impose considerable demands on Brazil's industry to carry out supply and demand side management measures.

In 1997, power shortages in large energy markets like Rio de Janeiro were considered as early warnings of the supply crisis. Major cities in the Amazon region are also under energy rationing schedules (Manaus and Santarém). If the Government of Brazil (GOB) and regulatory agencies are not successful in guiding the market and privatized utilities to reduce the risk of power shortages, repeated shortages could threaten the implementation of Brazil's privatization schedule.

However, most of the last large potential hydropower sources close to developed and dense load regions (i.e., the south and southeastern regions of Brazil) have already been developed. *Plano 2015* indicates that the necessary additional installed power plant capacity will come from the remaining hydropower projects in the southeast and midwest of Brazil, and untapped resources in the Amazon River Basin (26,318 MW), imported natural gas (5,146 MW), nuclear energy (2,618 MW), coal (1,800 MW) and renewable energy. If the GOB and regulatory agencies are not successful in guiding the market and privatized utilities to develop significant efficiency programs and short-term increases in generating capacity, the risk of power shortages could threaten Brazil's economic growth. This would in turn not only call into question the implementation of Brazil's electricity sector privatization schedule, but also public support for the GOB's larger sector reform effort.

In a multibillion-dollar industry such as energy, underlying economic aspects must be taken into consideration. The fact that wholesale energy prices are presently below long-run marginal costs has a twofold impact on this strategy: (i) large energy consumers have reduced incentives to invest in energy efficiency; and (ii) energy producers are hindered from investing in energy technologies that may have a higher initial capital cost when compared to other sources, such as renewable energy.

With inflation rates under control and electricity prices increasing (11.8 percent in 1997), the opportunities for energy efficiency measures are considerable, both in energy supply systems and in end-use applications. Privatization of the fixed generation assets and the competitive forces put in play by restructuring will gradually force increases in bulk energy prices towards their full economic recovery cost, a need recognized by the GOB to attract foreign investors. This underlying trend of costs and prices for energy will greatly improve incentives and consumer willingness to use energy more efficiently. By reducing effective demand for energy through cost-effective savings, it is possible to significantly reduce the need for additional fossil-fuel generating capacity.

An additional impact of privatization is rural communities currently served by subsidized power from state-owned utilities will be subject to a decrease in the quality of the service while unserved rural communities may wind up even further behind if utilities use a conventional approach to the problem (i.e., grid extension). In this scenario where decentralized, local, and clean generation solutions are not customarily examined or promoted, the Clean and Efficient Energy strategic objective will focus on the promotion of the adoption of market-based practices for clean energy by key actors. In order to achieve increased adoption of clean energy solutions and reach key actors, a balance between top-down and bottom-up approaches will focus on the areas of policy, financing, training and technology, where major barriers were identified.

In summary, the accompanying and wide-ranging structural and regulatory changes now underway in the power sector in Brazil will help determine what role environmentally friendly options, such as efficiency measures and increased use of renewable energy, will play in Brazil's energy future.

Non-Hydropower Energy Sources

As Brazil's economic growth pushes increased energy needs, it is certain that natural gas will play an increasing, albeit limited, role in Brazil's energy matrix, with the Bolivia-Brazil natural gas pipeline being developed. Power generation based on natural gas exhibits reduced GHG emissions when compared to other fossil fuels (e.g., coal and oil). The increased use of natural gas in Brazil not only can generate the bulk power needed to meet short term needs, but can also reduce emissions, particularly when compared as a fuel to Brazil's low quality, high sulfur content, and low energy concentration coal. As SO₂ promotes policies and regulations supportive of energy efficiency, industrial co-generation and natural gas industrial co-generation (which makes use of what otherwise would be wasted heat) will also benefit from this initiative.

Higher capital investment and transportation costs, as well as the low quality of Brazilian coal (high sulfur and ash content) clearly demonstrate that, within the foreseeable future, coal generation is not competitive with natural gas options, increasingly available through the Brazil-Bolivia natural gas pipeline. Considering that even pressurized fluidized bed coal combustion plants produce 1.8 lbs. of CO₂ per generated MWh and renewable energy sources are close to zero emissions, the SO₂ strategy, after careful examination of the future of coal generation in Brazil, chose not to focus on this technology.

Nuclear power is also identified as an option under *Plano 2015*. However, the nuclear power sector is not being privatized, and restrictions related to the Nuclear Non-Proliferation Treaty prevent USAID from working in nuclear power.

USAID's Role

Brazil, in its transition from a state-owned to a market-driven power sector regime, will need education, communication, training, and assistance to introduce and encourage adoption of market-based practices. It will also need assistance in ensuring environmentally sustainable electric power generation, transmission, distribution (including rural electrification), and end use, as well as in the mechanics of attracting and managing investment in the sector. Various GOB power agencies and the private sector are involved in the process of structural and regulatory

reform, and many of those key actors have asked for USAID assistance. USAID/Brazil can play a key catalytic and mentoring function as the roles of the key actors evolve. This creates an opportunity to inform and assist GOB agencies and market participants to incorporate the most up-to-date concepts, methods, and technologies for clean and efficient energy production and use, as well as to incorporate broader global environmental concerns than would otherwise be considered.

Key Issues

Brazil is on the verge of reshaping its existing energy industry and future energy sources. USAID intervention will provide assistance to Brazil to ensure that future energy demand is not met with inadequate fossil fuels or environmentally damaging hydropower reservoirs. Also, because current energy supply options can have adverse climate change impacts, it is necessary to increase Brazil's ability to detect and mitigate these impacts in order to provide the country with a suitable range of economic options from which to choose a sustainable energy path. Policy, regulation and financing mechanisms need to be put into place to guide the implementation of such environmentally sustainable paths.

Key issues that USAID might address include:

- (i) Assisting policy, regulation, training and technology supportive of market-oriented clean energy production and use;
- (ii) Achieving consensus among regulated agents (utilities, consumers, rural cooperatives, NGOs and others) on how to guarantee to private energy providers acceptable market entry costs when serving off-grid communities, while not harming exclusive rights of utilities to these markets;
- (iii) Assisting the design, implementation, monitoring and evaluation of utility utilization of energy efficiency funds;
- (iv) Decentralizing federal regulatory discretion to state level agencies
- (v) Resolving staffing, capacity building, operations and management of autonomous policy and regulatory bodies;
- (vi) Formulating policies and regulations to implement and disburse national subsidies for rural energy development;
- (vii) Developing a framework where federal-state regulatory relationships can be formalized;
- (viii) Tariff analysis and ratemaking;
- (ix) Assuring that the criteria for determining least cost options for rural energy services in off-grid communities take into consideration their capacity to pay and are sustainable;
- (x) Assisting the development of consumer councils by means of national and state initiatives; and
- (xi) Assisting in the development of financial vehicles supportive of clean and efficient energy production and use.

Criteria for prioritization of these issues will be developed in partnership with Brazilian counterparts, and will be reported on in the subsequent R4. Probable criteria for determining the range of issues within the Mission's manageable interest include the best use of limited

resources, impact on global climate change, and the impact on U.S. trade of goods and services.

3. Results Framework Description

From Special to Strategic Objective

As a Special Objective first funded under the Environmental Initiative for the Americas (EIA), the USAID/Brazil energy program (Special Objective 3, or SpO3) had focused on choosing and promoting specific clean energy technologies, notably renewable energy and energy efficiency, and the policies that support those technologies. Indicators were chosen to track the amount of technology penetration in Brazil, as well as various intermediate results along the same line. Having explored this target of opportunity and determined that the energy sector was a fruitful and substantial programmatic focus, the Mission decided to implement their energy programs through a Strategic Objective rather than a Special Objective. In reviewing the Special Objective program for transformation to a Strategic Objective, it also became clear that the Brazil electric power sector is too large to expect the original indicators to show real progress.

In the Strategic Plan submitted in January 1998, SO2 was stated as “Reduced rate of growth in greenhouse gas emissions from energy sources.” Following this submission, the Mission and USAID/Washington determined that this statement was too broad, and modified the SO statement to “Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use.” This new formulation reflects the level at which USAID/Brazil feels it can materially affect the energy sector in Brazil, together with its partners. The new wording is also more congruent with GOB objectives in the energy area.

In addition, USAID/Brazil concluded that the modified SO statement was technically more sound. Decision makers in the Brazil power sector are eager to work with U.S. counterparts on the development of the power sector, and are supportive of inclusion of clean and efficient energy production and use in sector reform and restructuring. When the Mission's SpO3 was established in late 1995, sector reform and the clear identification of key partners (and thus, appropriate points of intervention) were uncertain. Now, however, reforms are being effectively implemented, with full implementation expected in three to five years. The Mission has a clearer picture of how institutional roles, commercialization, and energy prices may evolve, as well as how market rules, models and institutional actors may evolve. The Mission also has a better understanding of possible scenarios where environmental concerns (such as GHG emissions) could have impact on decisions on future policies and energy pricing. There is also a clearer understanding of how the key actors in policy and finance will shape the future resource matrix. Most importantly, key actors, responsible for these changes to occur, have been identified and have asked for USAID assistance, consistent with USAID goals. Thus, the SO's focus on adoption of clean energy concepts, methods and technologies is a timely one, with potential for substantive USAID impact during the strategy period.

Key Actors

USAID will focus its efforts on a group of selected institutions, designated as key actors, whose agendas are supportive of the results framework. Key actors have also shown a clear commitment and capacity to cooperate with USAID, and their agendas are supportive of the

results framework. The identification of key actors was based on USAID institutional relationships built during the previous two years under the energy Special Objective.

Although subject to continuing reforms, the set of key actors is highly favored by the current institutional scenario to respond to Brazilian national and agency goals through clean and efficient energy production and use. Each key actor has overall as well as specific roles in both clean and efficient energy production and use. Additionally, due to their expertise, previous track record and relationship with the SpO3, these particular key actors will have a positive impact, assuming that if key actors are affected by on-going institutional reforms, their personnel and capacity will remain active in the clean and efficient energy production and use arena, assuring SO2 sustainability.

Assistance to key actors in policy, financing mechanisms, capacity building, and technology needs to be in place to guide the implementation of such environmentally sustainable paths. The rationale is that institutional capacities need to be developed so that key actors have the knowledge, skills, and experience to carry out the implementation. Specific key actors are:

The Ministry of Mines and Energy (MME)

Secretariat of Energy (SEN)

National Energy Policy Council (NEPC)

National Agency for Electric Power (ANEEL) and selected state regulatory agencies

MME's Centers of Excellence in Regulation of Energy Markets

(Centros de Excelência em Regulação de Mercados de Energia - CERME)

National Program for Electrical Energy Conservation (PROCEL)

National Center for Power Research (CEPEL)

National Energy Development Program for States and Municipalities (PRODEEM)

Investor and Public Owned Power Utilities (Concessionaires)

Brazilian Bank of Economic and Social Development (BNDES) and other selected development and commercial banks

The Ministry of Mines and Energy (MME), Secretariat of Energy (SEN), National Energy Policy Council (NEPC)

The Ministry of Mines and Energy (MME) is the Government of Brazil's (GOB) executive branch agency responsible for energy infrastructure in the country. Under Brazil's constitution, the provision of electric power is an obligation that the GOB takes on and guarantees to the people of Brazil. The provision of electric power by non-GOB entities is a new phenomenon and requires the granting of a concession by the GOB to an electric power provider. MME supervises and controls the development of energy resources and monitors all activities related to the power sector. MME is responsible for energy policy, as well as the quality and reliability of energy services and infrastructure necessary for Brazil's economic growth. MME is also responsible for how Brazil positions itself in Climate Change related issues insofar as it relates to the energy sector, counseling and consulting with the Brazilian Ministry of Foreign Affairs on Brazil's international position on GHG and Climate Change.

The Secretariat of Energy (SEN) carries the Minister's delegated responsibilities in these areas with regard to the energy sector. MME and SEN currently lack much of the needed structure to

manage such a process adequately, and are creating the National Energy Policy Council (NEPC). The soon-to-be implemented NEPC will deal with macro-energy policies, including division of federal/state responsibilities. The committee will include a wide range of ministries representatives and be chaired by MME. SEN will be NEPC's executive secretariat. The key role of both SEN and NEPC is to establish a coordinated policy framework for Brazil's energy resources and to advise on aspects relating to the energy sector. Specific responsibilities of MME/NEPC/SEN with regard to the restructured electricity sector will be to:

- (i) Formulate policies and regulations to implement and disburse national subsidies for rural energy development;
- (ii) Provide input to the Ministry of Environment in establishing environmental policy for the sector;
- (iii) Establish policy on electricity conservation (implemented through regulation and sponsored projects);
- (iv) Sit on the governing bodies of Federal Holding, Sector Financing, Indicative Planning, Independent System Operators, and Sector Services organizations;
- (v) Propose changes in sector legislation for approval by the Congress;
- (vi) Nominate the Board of Directors of ANEEL for approval by Congress;
- (vii) Nominate directors for the Federal Holding, Sector Financing and Indicative Planning organizations; and
- (viii) Exercise ownership functions for federal shareholdings on behalf of the Ministry of Finance.

Traditionally, SEN and other parts of MME have been staffed with people seconded from Eletrobrás, Brazil's national utility holding company. There is a critical need to strengthen the policy-making function within SEN and NEPC, so it becomes fully able to exercise its role without support from Eletrobrás. Sector privatization and the importance of distinguishing between government's roles as policy maker, regulator, and owner of those elements of the industry that will not be privatized, mean that MME's capability as a policy maker needs to be strengthened by providing additional people and skills. USAID intends to assist MME, SEN, and NEPC as it increases the number of specialist staff by providing specific training and an energy advisor on sector policy issues, focusing on clean energy.

Through these activities, USAID, with these counterparts, will address the following key issues:

- (i) Assisting policy, regulation, training and technology supportive of market-oriented clean energy production and use;
- (ii) Formulating policies and regulations to implement and disburse national subsidies for rural energy development; and
- (iii) Developing a framework where federal-state regulatory relationships can be formalized.

National Agency for Electric Power (ANEEL) and selected state regulatory agencies

The Agência Nacional de Energia Elétrica (ANEEL), or National Agency for Electric Power, is the recently established Federal Power Regulatory Agency. The closest U.S. parallel would be the Federal Energy Regulatory Commission (FERC). Relying on the structure of the previous

DNAEE, or National Department of Electric Energy, a now-extinct MME department, ANEEL started to function in December 1997. ANEEL is establishing the regulatory regime necessary to provide the right signals to the market to support the national energy policies promulgated by NEPC.

ANEEL regulates the power sector, sets guidelines for tariffs and ratemaking, approves tariffs, and has the authority to grant concessions to service providers (i.e., concessionaires, permissionaires, retailers, independent power producers, and self producers). Such an authority resembles a licensing or authorization power to grant a private agent the right to use a public commodity (like water in a river) to generate, transmit, or distribute power. The licenses may be granted to all actors in the power sector (e.g., transmission companies, distribution companies, and retailers). ANEEL is also charged with establishing competition among the actors, as well as reliability and cost effectiveness of service, including to rural areas. ANEEL's other mandates include decentralization of regulation to State Public Utility Commissions based on how well a State Commission is able to perform, and monitoring distribution utilities on the proper and effective use of the one percent energy efficiency levy noted above.

USAID will assist ANEEL through MME's Centers of Excellence (see below), as well as fund an Energy Efficiency Advisor to work with ANEEL and PROCEL to help develop criteria for good energy efficiency projects to be funded through the one percent energy efficiency levy.

USAID is also funding a Regulatory Partnership between ANEEL and the U.S. National Association of Regulatory Utility Commissions (NARUC) to facilitate the sharing of U.S. regulatory expertise between the U.S. and Brazil.

As has been seen in various Brazilian states (Ceará, Rio Grande do Sul, Rio de Janeiro, São Paulo and Bahia) once state regulatory agencies are established, they require intense technical advisory in order to ensure long-lasting and respectable performance. There is room for assistance in establishing state regulatory agencies as well as in providing requisite technical assistance to state regulators and staff. Ideally, regulatory advisory assistance could be established where two or three agencies could be the focus. This combined approach would consider individual advisory assistance at the state level, but would also provide joint training and advisory assistance where regulators and staff from different states could meet and share their experiences, concerns, and solutions.

Through these activities, USAID, with these counterparts, will address the following key issues:

- (i) Assisting policy, regulation, training and technology supportive of market-oriented clean energy production and use;
- (ii) Achieving consensus among regulated agents (utilities, consumers, rural cooperatives, NGOs and others) on how to guarantee to private energy providers acceptable market entry costs when serving off-grid communities, while not harming exclusive rights of utilities to these markets;
- (iii) Assisting the design, implementation, monitoring and evaluation of utility utilization of energy efficiency funds;
- (iv) Decentralizing federal regulatory discretion to state level agencies;
- (v) Resolving staffing, capacity building, operations and management of autonomous

- policy and regulatory bodies;
- (vi) Formulating policies and regulations to implement and disburse national subsidies for rural energy development;
- (vii) Developing a framework where federal-state regulatory relationships can be formalized;
- (viii) Tariff analysis and ratemaking
- (ix) Assuring that the criteria for determining least cost options for rural energy services in off-grid communities take into consideration their capacity to pay and are sustainable;
- (x) Assisting the development of consumer councils by means of national and state initiatives; and
- (xi) Assisting in the development of financial vehicles supportive of clean and efficient energy production and use.

MME's Centers of Excellence in Regulation of Energy Markets (Centros de Excelência em Regulação de Mercados de Energia - CERME)

In a country with continental dimensions as Brazil, decentralization is essential. MME understands that decentralization will have to start with the decentralization of knowledge and human capacity. Under a Memorandum of Understanding (MOU) with selected Federal Universities (Brasília, São Paulo, Rio de Janeiro, Bahia, Rio Grande do Sul, etc.), MME (through a mix of GOB, World Bank, and IDB funds) is providing the means to develop regulatory research centers in Brazil to disseminate knowledge on utility regulation. Different levels of training and research will be carried out to provide SEN, NEPC, ANEEL, State Public Utility Commissions, power utilities, and others with capacity in power policy and regulation. These activities will be funded for five years when it is expected that universities and associated research centers will reach sustainability. Both MME and the Centers of Excellence (headquartered in Brasília) have requested USAID assistance to develop and disseminate information on clean and efficient energy production use. There is also a high level synergy potential to multiply USAID training results and provide the necessary local logistic support.

USAID assistance will help develop a series of regulatory training workshops that would be held with ANEEL and the Centers of Excellence. These training courses will evolve into a series of publications on power sector regulation. Each volume would have one or two themes and would be distributed in the workshops as training material. These volumes would also be distributed by MME to state regulatory agencies, consumers associations, utilities, and other entities. At the end of each year, one of the Universities (most likely the Federal University of Brasília, which has a very modern press) would publish a book, with a chapter on each theme. The Minister of Mines and Energy would write the preface, and Brazilian and U.S. specialists would provide additional chapters. Selection of specific topics would have to be made in consultation with MME, ANEEL, and CERME. USAID's participation in the very first publication on power regulation in Brazil is a high-visibility and high-impact opportunity.

Through these activities, USAID, with these counterparts, will address the following key issues:

- (i) Assisting policy, regulation, training and technology supportive of market-oriented clean energy production and use; and

- (ii) Resolving staffing, capacity building, operations and management of autonomous policy and regulatory bodies.

National Program for Electrical Energy Conservation (PROCEL)

PROCEL is MME's program for energy efficiency. Officially, PROCEL falls under the responsibility of MME. In practice, Eletrobrás runs the program through PROCEL's Executive Secretariat in Eletrobrás headquarters in Rio de Janeiro. In the coming months, PROCEL may merge with Brazil's Electric Power Research Center (CEPEL) to form a research and technical institution reporting directly to SEN/NCEP. PROCEL has been very successful in achieving their goals and also in coordinating actions with bilateral and multilateral agencies and donors such as CIDA, the World Bank, the European Community (ALURE), and the United Nations Development Program (UNDP). PROCEL has confirmed its interest in having USAID assistance for training, seminars and, most importantly, for the one percent energy levy for energy efficiency. PROCEL is very well organized and well connected with all the agents in the power sector (utilities, energy service companies -- ESCOS, INEE, ANEEL, Eletrobrás, MME, industries and many others).

In general, although PROCEL has staff and equipment, they need assistance in designing and implementing state of the art efficiency programs, as well as monitoring and verification programs to track the success of their programs. USAID/Brazil has funded an energy efficiency advisor to work with PROCEL, and envisions continuing that assistance, as well as assistance to ANEEL to coordinate the inclusion of energy efficiency into Brazil's new regulatory regime. More specifically, PROCEL has requested USAID assistance:

- (I) To assist PROCEL and ANEEL program the funds resulting from the one percent energy efficiency levy which are to be targeted towards energy efficiency. PROCEL is quite aware that they will have to heavily deal with state regulatory commissions to enforce the one percent energy efficiency mandate on utilities (and get their funds);
- (ii) To have US specialists speak at and participate in their International Seminar on energy efficiency taking place in October 1998; and
- (iii) To develop implementation and evaluation plans for an Energy Efficiency Loan to Brazil that the World Bank is preparing. PROCEL is charged with developing the technical proposal to the World Bank, and coordinating the implementation of projects to be funded under the loan.

Through these activities, USAID, with these counterparts, will address the following key issues:

- (i) Assisting policy, regulation, training and technology supportive of market-oriented clean energy production and use;
- (ii) Assisting the design, implementation, monitoring and evaluation of utility utilization of energy efficiency funds; and
- (iii) Assisting in the development of financial vehicles supportive of clean and efficient energy production and use.

National Center for Power Research (CEPEL)

CEPEL is the equivalent in the U.S. of the Department of Energy's (DOE) national laboratories, and the private sector Electric Power Research Institute (EPRI). Like PROCEL, CEPEL is also operated through Eletrobrás. As noted above, in the coming months CEPEL may merge with PROCEL to form a research and technical capacity reporting directly to SEN. USAID has been coordinating its activities with CEPEL, but has not been providing direct assistance to CEPEL.

Through these activities, USAID, with these counterparts, will address the following key issues:

- (i) Assisting policy, regulation, training and technology supportive of market-oriented clean energy production and use.

National Energy Development Program for States and Municipalities (PRODEEM)

PRODEEM is MME's program for rural off-grid energy services. PRODEEM is governed by an interministerial council, and operated by MME. PRODEEM has representatives or offices in every state of Brazil, and also agreements with state utilities, NGOs and private sector foundations for project identification, design, implementation, and monitoring. They have been successful in implementing "social" residential renewable energy projects (give-aways of solar panels and solar water pumps) using federal budget funds. PRODEEM is now trying to take advantage of regulatory reforms in Brazil by shifting to a market-oriented approach, with better monitoring of private-sector participation. They are also expanding their agreements (in number and scope) for project identification, design, implementation, and monitoring to increase outreach. MME is planning support to establish an Executive Secretariat for PRODEEM to more effectively accomplish the transition to a market-based approach.

The Inter-American Development Bank's Sustainable Markets for Sustainable Energy (IDB/SMSE) program is trying to establish an Action Plan with PRODEEM. This is somewhat in parallel with the World Bank's preparation of an integrated commercial/social rural electrification (ICSP) loan for the northeast of Brazil (i.e., the states of Ceará, Bahia, and Minas Gerais). USAID assistance would be provided by means of a Policy Advisor to PRODEEM. Negotiations with local UNDP Office to cost-share this activity have been initiated on an informal basis. The Policy Advisor would locally assist PRODEEM with:

- (i) Policy in preparation for PRODEEM's restructuring; and
- (ii) Institutional contacts with World Bank and IDB/SMSE.

The Policy Advisor would be dedicated to PRODEEM for 80 percent of his/her time, and to USAID for 20 percent for coordination of PRODEEM's activities with USAID's other renewable energy activities and state level actors in rural electrification.

Through these activities, USAID, with these counterparts, will address the following key issues:

- (i) Assisting policy, regulation, training and technology supportive of market-oriented clean energy production and use;
- (ii) Achieving consensus among regulated agents (utilities, consumers, rural cooperatives, NGOs and others) on how to guarantee to private energy providers

- acceptable market entry costs when serving off-grid communities, while not harming exclusive rights of utilities to these markets;
- (iii) Formulating policies and regulations to implement and disburse national subsidies for rural energy development;
 - (iv) Assuring that the criteria for determining least cost options for rural energy services in off-grid communities take into consideration their capacity to pay and are sustainable;
 - (v) Assisting the development of consumer councils by means of national and state initiatives; and
 - (vi) Assisting in the development of financial vehicles supportive of clean and efficient energy production and use.

Investor and Public Owned Power Utilities (Concessionaires)

USAID has a special interest in three States (Ceará, Bahia and Minas Gerais) that are currently the target states for the World Bank Integrated Commercial/Social Power loan (to finance rural decentralized clean power). The utilities in these States are COELCE, COELBA, and CEMIG (Ceará, Bahia and Minas Gerais respectively). COELCE (Ceará) is a state-owned utility, but will be auctioned (privatized) early in 1998. COELBA (Bahia) was privatized in 1997. The state government of Minas Gerais sold 51 percent of CEMIG shares in 1997.

As noted above, new private owners of utilities are not particularly interested in investing in rural markets (either extending the grid or servicing consumers by rural decentralized power) because return on investment is low when compared to other capital opportunities. In remote areas, the chances are great that the least cost option for energy services is local generation, usually a clean source such as small hydro, biomass, or residential solar power. State governments are increasingly aware that, in order to integrate the rural population in the development process, they must have a mechanism to provide rural power that is not now readily available from new private utility owners. However, the traditional high cost of rural services is frequently greater than the capacity of customers to pay for service. Subsidies are unpopular and non-sustainable, and urban consumers generally do not like to pay more for power, allowing the utility to recover their average cost plus a premium. Moreover private utilities are unwilling to accept other service providers in their exclusive concession area, so while this segment of the market is not attractive because of low investment returns, it also is not exposed to competition as utilities protect their service areas. PRODEEM, the World Bank, and IDB/SMSE are exploring small and micro enterprise approaches to rural service, involving sub-concessions called permissionaires. Through assistance with ANEEL and PRODEEM, USAID will work with the World Bank, IDB/SMSE, the utilities, and local entrepreneurs to develop this and other alternative approaches for rural electrification.

Through these activities, USAID, with these counterparts, will address the following key issues:

- (i) Achieving consensus among regulated agents (utilities, consumers, rural cooperatives, NGOs and others) on how to guarantee to private energy providers acceptable market entry costs when serving off-grid communities, while not harming exclusive rights of utilities to these markets;
- (ii) Assisting the design, implementation, monitoring and evaluation of utility

- utilization of energy efficiency funds;
- (iii) Assuring that the criteria for determining least cost options for rural energy services in off-grid communities take into consideration their capacity to pay and are sustainable; and
- (iv) Assisting the development of consumer councils by means of national and state initiatives.

Brazilian National Bank of Economic and Social Development (BNDES) and other selected development and commercial banks

BNDES is the National Economic and Social Development Bank and has recently been assigned by the GOB to perform the function of financing the power sector (a role that was previously reserved to Eletrobrás). They will have an important role in financing of all forms of infrastructure, including electric power. BNDES will be responsible (with technical guidance from PROCEL, PRODEEM, and others) for on-lending the World Bank's energy efficiency and rural electrification loans to viable projects. Thus, although the exact nature and extent of BNDES' role in power sector finance is still under development, BNDES has indicated interest in receiving assistance from USAID in developing appropriate financing vehicles for clean energy.

The Banco do Nordeste do Brasil (BNB), or Northeast Development Bank, also has an important financing role. BNB has shown itself to be sensitive to rural markets through the implementation of small loans for rural development, including a window for renewable energy. Recently BNB has provided half the funds of a partnership between Golden Genesys (a U.S. solar energy firm) and Fundação Teotonio Vilela (FTV), a Brazilian NGO, to establish a market-oriented micro-finance program in Alagoas and Bahia for residential solar power in the northeast. BNB is interested in working with USAID on developing appropriate financing vehicles for clean energy, including training extension workers to do economic analyses for rural renewable energy systems.

Through these activities, USAID, with these counterparts, will address the following key issues:

- (i) Assisting in the development of financial vehicles supportive of clean and efficient energy production and use.

Adoption

By “adoption” it is meant that concepts, methods, and technologies in any of the arenas defined by the four IRs (i.e., policy/regulation, information/training, financing and technology) have, to a reasonable extent, been incorporated in key actors' decision making process. It also implies that adoption made a difference in key actors' plans or actions. Necessary institutional stages such as discussions, studies of concepts, methods, and technologies or its elements may be considered as conducive of adoption.

Clean and Efficient Energy Production and Use

The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or

less-than-zero emissions of greenhouse gases.” Under specific Brazilian circumstances, indigenous energy resources, and necessary least-cost competitive approaches, various generation technologies are available, including small hydro, solar, biomass, wind and others.

Targeted policies to foster clean and efficient energy production and use and developing a sound policy and regulatory capacity within Brazil are prerequisites for clean and efficient energy production and use. Policy measures include not only the obvious federal, state, and local laws, decrees, regulations, and other guidelines, but also corporate policies and public awareness which may influence choice in the selection of electricity production and consumption.

Emerging from a state-owned structure of operation, many key actors need increased access to information and training on using market based mechanisms to operate and/or finance clean and efficient energy production and use. Financial markets exist in Brazil that can potentially finance clean and efficient energy systems to a higher extent than the current level. Investors, financial institutions, and markets need more information and familiarity as to how existing and innovative mechanisms can be effectively and profitably managed. Management familiarity with such techniques can increase the number of successful financing operations as well as reduce mismatched risk perceptions between developers and investors, presently identified as a major market constraint.

Implementation of new technology and know-how in Brazil is needed to ensure that the best practices are in place at a time of crucial sector reforms. Clean and efficient energy options sometimes require alternative mechanisms to those generally available. USAID support to technology cooperation and projects by U.S. private sector firms can introduce and leverage the application of U.S. technologies under Brazilian conditions.

a. Causal Relationships

USAID/Brazil has decided on a four-pronged approach to achieving SO₂, “Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use.” As stated earlier, Brazil has already initiated a major sectoral restructuring. In order to incorporate the desired clean energy approach into all aspects of the ongoing power industry changes, USAID has identified four foci for action: policy-making, information dissemination, financing, and technology cooperation. In this way, USAID will have an effect on the regulatory, technological, and market aspects of energy sector restructuring, which will increase the probability of creating a sustainable clean and efficient energy program. The four intermediate results will together form the basis of a new cleaner and more efficient approach to energy policy, production, and use in Brazil.

USAID has been and will continue to provide, under IR 2.1 (Targeted policies promoted that foster clean and efficient energy production and use), long-term technical expertise to the GOB in formulating policies and programs that support both privatization and clean and efficient energy.

This will ensure a positive and stable environment for the establishment of market-based clean energy practices and technologies, which will encourage investment in the industry.

Through IR 2.2 (Increased access of key actors to information on market-based mechanisms for

operating and financing clean and efficient energy production and use), USAID/Brazil will continue its training and information dissemination activities by designing a clean energy training program and information publication program. This broad-based program will reach both governmental and non-governmental organizations, profit and non-profit institutions, and will cover technical, regulatory, and financial topics. By strengthening the internal capacity of so many key organizations and preparing them for their new roles in the restructured energy sector, USAID seeks to ensure the independence and sustainability of the key actors.

With IR 2.3 (Increased availability and use of financing for clean and efficient energy production and use), the Mission seeks to increase the role of non-USAID funds in the development of the privatized Brazilian energy sector. While funds are available in capital markets of various sizes for clean energy, market actors don't always understand the technology or create market mechanisms which can support and finance clean energy. USAID's role is in increasing understanding and facilitating the development of new markets. For example, USAID/Brazil will continue working with PROCEL to develop implementation and evaluation plans for an Energy Efficiency Loan to Brazil which the World Bank is preparing. PROCEL is charged with developing the technical proposal to the World Bank, and coordinating the implementation of projects to be funded under the loan. USAID/Brazil has also funded an energy efficiency advisor to work with PROCEL, and will continue that assistance. USAID/Brazil is additionally seeking ways to involve UNDP in providing technical assistance, possibly by cost-sharing an energy adviser who will work to facilitate and coordinate donor activities. Building on the training and regulatory programs, key actors will be able to capitalize on, extend and develop new financial mechanisms to support clean and efficient energy production and use.

IR 2.4 (Increased technology cooperation between U.S. and Brazilian firms for clean and efficient energy production and use), will build on the policy, training and information dissemination, and financial work to work for a more friendly marketplace for clean and efficient energy. Positive examples of new clean energy business opportunities, especially in off-grid rural areas, must exist before the market at large will respond. Technology cooperation will facilitate U.S.-Brazil industry partnerships to develop these seed projects. The Mission intends to extend funding for a Brazil-based U.S. clean energy industry representative to help identify market opportunities, as well as support U.S. trade delegations as a catalyst for trade in specific technologies.

b. Critical Assumptions

The approach taken in this SO is premised on the continuance of an enabling environment in Brazil and of the institutional capacity of USAID. This amounts to the need for a continuing commitment to and implementation of power sector reform and privatization measures at the federal and state levels in Brazil, as well as the continued federal and state government commitment to private investment. Under this framework, the following critical assumptions are made for conditions in Brazil:

- (i) Brazil's economy will grow causing increased demand for electricity as projected;
- (ii) Power sector reform and privatization in the power industry will increase competition among generation sources. That in turn will cause electricity prices to reach economic recovery costs rendering energy efficiency and co-generation

- investments more competitive when compared to conventional power sources. For the same reason, biomass co-generation will be more attractive;
- (iii) Initially, industrial policy will lower import tariffs on renewable energy equipment and augment equipment supply. As a consequence, in-country manufacturing will be attractive. Technology improvements (solar panels and gasifiers) and enhanced market perspectives will reinforce the decreasing trend on equipment's price; and
 - (iv) Based on the fact that renewable decentralized energy systems are the least cost option in off-grid rural areas, municipal/state level representations, as well as rural cooperatives, will continue to support the establishment of specific financing mechanisms to expand rural energy services. As the economy and rural incomes grow, willingness/capacity to pay for energy services in rural areas will also increase.

USAID's program activities are focused on mentoring and training key actors in fundamental concepts and methods, and in assisting them with pilot projects to demonstrate the application and feasibility of clean and efficient energy production and use in Brazil. Assumptions must also be included that focus on the degree to which USAID/Brazil can directly impact events or conditions with various key actors, thereby affecting the sector at large.

Assumptions about USAID's ability to successfully achieve the SO's programmatic goals are:

- (i) USAID's mentoring, training, and pilot programs will actually foster clean energy initiatives within the Brazilian power sector. Such an assumption is supported by the fact that various elements of the Government of Brazil and the Brazil private sector are in the process of structural and regulatory reform, and many of those actors have asked for USAID assistance;
- (ii) Sector reforms will focus on the particular policy, regulatory, and institutional issues that currently hinder the development of clean and efficient energy production and use;
- (iii) Needed reforms will continue to be effectively implemented by the GOB's administration; and
- (iv) Program resource levels will be sufficient to carry out the appropriate mentoring, training, and pilot activities.

4. Commitment and Capacity of Other Development Partners

Brazilian Counterparts

In order to keep the SO within USAID/Brazil's manageable interest, a set of key Brazilian actors or development partners were defined when conceiving the SO2 results framework. The identification process benefited from USAID institutional relationships built during the previous two years under the energy special objective. Key actors have also shown a clear commitment and capacity to cooperate with USAID and their agendas are supportive of the results framework.

Although subject to continuing reforms, the set of key actors is highly favored by the current institutional scenario to respond to country and specific agencies goals through clean and

efficient energy production and use. Each key actor has overall, as well as specific, roles in both clean and efficient energy production and use. Additionally, due to their expertise, previous track record, and relationship with SpO3, the choice of particular key actors will have a positive impact, assuming that if key actors are affected by on-going institutional reforms, their personnel and capacity will remain active in the clean and efficient energy production and use arena, assuring SO2 sustainability.

A clear example of commitment by high-level key actors is the fact that under the privatization and independent regulation process, MME, ANEEL, and emerging State regulatory agencies are mandated to create regulatory and financial mechanisms to elicit delivery by the power sector of off-grid renewably based electricity services. Commitment has also been demonstrated by PRODEEM in initiating restructuring actions in numerous aspects of clean energy production in its off-grid programs. In order to further establish and strengthen various implementation links with NGOs, utilities, government and private initiatives, PRODEEM has specifically requested USAID's technical assistance to restructure, decentralize and further expand the clean energy program scope, under a market oriented approach.

In line with SO2's goal to increase the adoption of efficient energy production and use, PROCEL has also requested USAID to play a catalytic role in designing and monitoring energy efficiency programs in utilities. Under recent licensing regulations, ANEEL and PROCEL have the mandate to approve and monitor utilities' programs that will direct 1 percent of gross annual utility revenues (approximately \$198 million annually) to energy efficiency activities.

Under sector reforms, key actors have an emerging role that is evolving in a diversified manner at different levels of capacity. Most important is the fact that all key actors continue to demonstrate a strong commitment to the SO2 results framework.

Other donor activities

Balancing the commitment of the Brazilian key actors is the involvement of other donor agencies. One key to the success of the integration of renewable and clean energy practices into the restructuring of Brazil's energy sector will be the coordination and complementarity of USAID programs with those of the other donors active in Brazil.

GTZ

Germany's Gesellschaft für Technische Zusammenarbeit (GTZ) has provided support to the NGO IDER (Institute for Sustainable Development and Renewable Energy) for the installation of a pilot project involving fifteen photovoltaic (PV) pumping systems in remote villages of the state of Ceará, through a cooperative project the Companhia Energética do Ceará (COELCE) and the State Planning Department.

In the state of Minas Gerais, GTZ also contributes to CEMIG's electrification program "Luz de Minas" which includes the implementation of a pilot PV program for rural electrification. Under this program, CEMIG provides and installs the stand-alone PV systems to isolated farmers, houses, and communities, and provides whatever maintenance is needed. The initial stage of the Luz de Minas program was fundamentally research and development on the deployment of stand-

alone PV applications, but the program is now commercially focussed, and the costs of the technology and implementation have been considerably reduced over the course of the initial phase of the program.

In another project, the Morro Camelinho wind power station, Brazil's first, came online in 1994, co-financed by the state of Minas Gerais and GTZ, and provided basically free power to the consumers. Unfortunately, the wind quality is only good on the mountain tops, and the population is concentrated in the valleys where there is water access and some protection from the winds, so wind systems for small individual houses has proved rather uneconomical.

European Union

The European Union (EU) has been focussing its development efforts on supporting the Brazilian states during the national energy sector restructuring. Primarily this assistance has been through ALURE, a program for the promotion of energy cooperation, which is structured to have dual Brazilian and EU direction. Initial efforts have involved workshops and regulatory assistance in the state of Bahia through ANEEL, the national Agency for Electric Power. The EU has also been involved in preparation of feasibility studies for the World Bank energy efficiency loan. Through these activities, the EU hopes to increase European trade in energy technologies. The total aid package has amounted to \$3.4 million.

The second phase of the EU's program is under development, and is anticipated to involve \$5 million in assistance. The EU will form a partnership with COELBA, the state of Bahia's energy utility to promote renewable energy, especially solar power. This will be primarily through support of entrepreneurship, dealing with permissionaires.

IDB

The Inter-American Development Bank (IDB) has been involved in two discrete assistance efforts with the GOB. The first activity involves a \$150 million loan to Eletrobrás to support the construction of a north-south power transmission line to connect the north/northeast power grid to the south/southeast grid. This connection will allow 500kv of optimal power supplies with less seasonal fluctuation, as hydropower generated during the rainy season in one region can be shared with the other region during its dry season. Within this loan, \$1.5 million has been designated for institutional capacity building, to be administered through the Independent System Operator, the Independent Planner, and ANEEL. Training activities will require \$650,000 of the institutional capacity building funds, and the remainder will be used for technical analyses of tariff structuring and free access.

The second focus involves linking IDB's Sustainable Markets for Sustainable energy program with a \$400,000,000 IMF small and medium enterprise fund to create a program to promote renewable energy entrepreneurship. As PRODEEM undergoes restructuring, the IDB hopes to use these funds to strengthen market-oriented rural renewable energy options in Ceará, Bahia, and Minas Gerais.

UNDP

The United Nations Development Programme (UNDP) has been serving as trustee for PROCEL's energy efficiency fund, taking a two-percent administration fee. It is also looking to provide, in cooperation with USAID, a technical advisor to PRODEEM. The advisor will serve as a facilitator and coordinator between UNDP, the World Bank, the IDB, and USAID, to maximize impact of all donor programs.

World Bank

The World Bank is currently developing two loans to support the privatization of the energy sector in Brazil. One loan, which promotes energy efficiency programs, will be funded at a total of \$150 million, and will disperse funds through either Eletrobrás or PROCEL to energy utilities. Preliminary work for this project is well advanced.

The second loan, called the Integrated Commercial/Social Power loan for the northeast of Brazil, focusses on bringing renewable energy, primarily off-grid solar residential power, to isolated rural communities. Funds will total \$100 million, and will be programmed through PRODEEM. USAID was involved in the preparation of three of five preliminary studies.

5. Illustrative Approaches

IR 2.1: Targeted policies promoted that foster clean and efficient energy production and use

The regulatory partnership between ANEEL and U.S. Public Utility Commissions will provide the opportunity to form a partnership arrangement with the Brazilian federal regulatory agency. This partnership will make available the long experience of U.S. regulatory commissions and their views and assessment of how to develop policy and regulation mechanisms capable of improving management of energy efficiency mechanisms and clean, decentralized energy supply. One example is the assistance to PROCEL and ANEEL in designing and monitoring programs that will direct funds from the "energy efficiency levy" on the utilities' gross energy sales, paid by consumers, to investments in energy efficiency projects.

IR 2.2: Increased access of key actors to information on market-based mechanisms for operating and financing clean and efficient energy production and use

USAID will continue its highly regarded training activities by designing a clean energy training program and publication program involving ANEEL and MME's Centers of Excellence (Federal University of Brasilia and others). The training program will also focus on energy efficiency with PROCEL, INEE (National Institute for Energy Efficiency, a non-profit institution), ABESCO (Brazilian Energy Efficiency Companies National Association), selected power utilities and NGOs. To strengthen the informational links and provide financial agents with appropriate skills to better manage and expand clean financing mechanisms, training will focus on financial institutions.

Training and information provided to ANEEL and State regulatory agencies about integrated resource planning and tariff design will make them effective in negotiating with concessionaires and permissionaires to determine most economic conditions of service, appropriate revenue

formulae, and corresponding incentives. As a consequence, regulatory energy price formula will not discriminate between decentralized clean energy production and grid extension.

IR 2.3: Increased availability and use of financing for clean and efficient energy production and use

The World Bank has recognized the threat that privatization and lack of clean energy market mechanisms pose to rural communities and is developing an Integrated Commercial/Social Power loan for the northeast of Brazil. The aim of the loan is to create a market in rural areas to serve the rural poor in the absence of a viable grid connection, largely through village and residential scale renewable energy systems. The Clean and Efficient Energy strategic objective will support the World Bank loan initiative and will focus on activities that have the potential to reduce barriers to market development. These barriers were identified as: lack of local technical expertise on renewable energy to rural communities (project development, operation, and maintenance) by utilities and NGOs; micro credit financing; institutional articulation between state and federal agencies; information support for project development; regulatory constraints; high market entry cost to new agents; and others.

USAID/Brazil has funded an energy efficiency advisor to work with PROCEL, and envisions continuing that assistance, as well as assistance to ANEEL to coordinate the inclusion of energy efficiency into Brazil's new regulatory regime. More specifically, PROCEL has requested USAID assistance to develop implementation and evaluation plans for an Energy Efficiency Loan to Brazil that the World Bank is preparing. PROCEL is charged with developing the technical proposal to the World Bank, and coordinating the implementation of projects to be funded under the loan.

IR 2.4: Increased technology cooperation between U.S. and Brazilian firms for clean and efficient energy production and use

Positive examples of new clean energy business opportunities, especially in off-grid rural areas, must exist before the market at large will respond. Technology cooperation will facilitate U.S.-Brazil industry partnerships to develop these seed projects. Already opportunities for renewable energy applications in Brazil have been identified in four settings:

- (I) Off-grid renewable energy projects in the Legal Amazon (using sawmill residues in Mato Grosso and Pará);
- (ii) Small hydropower projects up to 25 MW both grid or mini-grid connected;
- (iii) Grid connected projects (biomass fueled and windmill generation projects above 10 MW) in the south and southeast regions; and
- (iv) Off-grid renewable energy projects (wind and small solar generation projects) in the northeast and north.

In these cases, where grid extension to conventional power sources has already been determined to be economically unfeasible and small renewable energy applications are the least-cost option, the constraints are market delivery mechanisms and sustainability. USAID/Brazil would like to extend funding for a Brazil-based U.S. clean energy industry representative to continue to identify market opportunities, as well as develop the seed projects

that will create delivery mechanisms. In addition, it will support U.S. trade delegations as a catalyst for trade in particular technologies. This will transform demand for decentralized renewable energy in rural areas of Brazil to functional markets for U.S. clean energy technologies.

6. Sustainability

For the restructuring of Brazil's power sector to be environmentally and economically sustainable, Brazilian institutions must not only be exposed to, but must incorporate policy measures and financing mechanisms that make the implementation of such environmentally sustainable paths. Program activities must provide these institutions with the capacity to continue to encourage the development of renewable energy sources in Brazil, once USAID support ends. The actions of these institutions must be socially and economically reinforced.

Market sustainability requires a certain volume of transactions, which assumes accessible finance, buyers and sellers. It also requires alternative and competitive networks and channels capable of distributing renewable energy goods along with customer confidence for maintenance. Sustainability of USAID's energy program will be achieved by creating a freestanding market for rural energy services using renewable energy.

For the increased use of renewable energy and energy efficiency to be sustainable, it must be based on market mechanisms. The barrier is not technology; the technology is proven. The barriers are in the establishment of sustainable markets and delivery mechanisms for renewable energy. Energy efficiency and commercialization of renewable energy for on and off-grid applications face institutional, financial, and regulatory barriers. The changes now sweeping the Brazilian energy sector offer an important opportunity to shape the policy environment in ways that will support expanded private investment in renewable energy sources.

7. Judging Success

USAID/Brazil will measure the degree to which SO activities result in key actors' adoption of concepts, methods and technologies for clean and efficient energy production and use. USAID will be meeting in mid-1998 with the key actors to refine the submitted program benchmarks for adopting clean and efficient energy production and use. This will include the establishment of baseline and annual target levels. These indicators will be updated annually if necessary. Cooperating agencies and contractors will participate in this process.

During these same meetings, USAID will begin to establish with key actors, cooperating agencies, and contractors an agreed annual working plan to monitor and collect indicators as well as establishing targets and baselines. A minimal monitoring structure for indicator collection is already in place and the intention is to improve its performance and reliability by incorporating both collection methodology refinements and monitoring routines into the SO's task orders. Cooperating agencies and contractors will be asked to keep a detailed record of achievements compatible with selected indicators that will be consolidated and reported to management. The refined indicators, baseline data, and annual targets will be reported on in the subsequent R4.

8. Indicators

SO 2: **Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use**

Indicator 1: Incorporation of concepts, methods, and technologies for clean and efficient energy production and use in the operations of key actors

Unit of Measure: Number of key actors who have met in 60 percent of their annual benchmarks.

Source: Contractors, cooperating agencies and key actors

Indicator Description: Indicator will be the number of key actors who have met in that year 60 percent of their annual benchmarks for adopting clean and efficient energy production and use. Key actors may include the Ministry of Mines and Energy, PRODEEM/MME, PROCEL/MME, Energy Service Companies, Brazilian National Association for Energy Service Companies (ABESCO), Energy Efficiency Agencies or Institutes, MME's Centers of Excellence and related universities, National Research Center for Power Research (CEPEL), investor and public owned power utilities (concessionaires), rural cooperatives, power permissionaires, NGOs, Renewable Energy Developers and their associations, ANEEL and selected State regulatory agencies, selected development and commercial banks and financial/investment institutions. The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.”

Comments: As activities initiate with each key actor, task orders will include definition of annual program benchmarks for adopting clean and efficient energy production and use. Points within the actor's annual plan that relate to adoption of clean and efficient energy production and use (within the limit of one year, after activities are initiated) will be identified by key actor and contractor/cooperating agencies. In the case that actor does not have a defined annual plan, a set of realistic benchmarks will be set. Contractors/cooperating agencies will be required by USAID/Mission to check achievement of benchmark entries by following on and requesting information to said key actor. A systematic follow-up system has been developed by the Mission and will include contractors/cooperating agencies periodic reports and a backup supporting matrix, which will have a list of specific benchmarks and targets by key actor. This indicator is non-cumulative.

IR 2.1: **Targeted policies promoted that foster clean and efficient energy production and use**

Indicator 2.1.1: Advancement of policies and regulations by key actors that contribute to the adoption of concepts, methods, and technologies for clean and efficient energy production and use

Unit of Measure: Number of steps accomplished in policy formation

Source: Contractors, cooperating agencies and key actors

Indicator Description: Steps are defined as: identification, analysis, development, validation, promotion, training, adoption, implementation and enforcement. The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.” Key actors may include the Ministry of Mines and Energy, PRODEEM/MME, PROCEL/MME, Energy Service Companies, Brazilian National Association for Energy Service Companies (ABESCO), Energy Efficiency Agencies or Institutes, MME's Centers of Excellence and related universities, National Research Center for Power Research (CEPEL), investor and public owned power utilities (concessionaires), rural cooperatives, power permissionaires, NGOs, Renewable Energy Developers and their associations, ANEEL and selected State regulatory agencies, selected development and commercial banks and financial/investment institutions.

Comments: Targeted policies (inclusive of private sector firms’ corporate policies, or utilities’ policies) and regulations (Federal and State) will be identified in task orders and cooperators working plans. Elements of policies/regulations that foster clean and efficient energy production and use may also be considered as targets for this indicator. Contractors/cooperating agencies will be required by USAID/Mission to check achievement of benchmark entries by following on and requesting information to said key actor. A systematic follow-up system has been developed by the Mission and will include contractors/cooperating agencies periodic reports and a backup supporting matrix, which will have a list of target policies and steps achieved. This indicator is non-cumulative.

IR 2.2: **Increased access of key actors to information on market-based mechanisms for operating and financing clean and efficient energy production and use**

Indicator 2.2.1: Key actors using market-based mechanisms to operate and/or finance clean and efficient energy production and use

Unit of Measure: Percentage (%)

Source: Contractors, cooperating agencies and key actors

Indicator Description: The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.” Key actors are the Ministry of Mines and Energy, PRODEEM/MME, PROCEL/MME, Energy Service Companies, Brazilian National Association for Energy Service Companies (ABESCO), Energy Efficiency Agencies or Institutes, MME's Centers of Excellence and related universities, National Research Center for Power Research (CEPEL), investor and public owned power utilities (concessionaires), rural cooperatives, power permissionaires, NGOs, Renewable Energy Developers and their associations, ANEEL and selected State regulatory agencies, selected

development and commercial banks and financial/investment institutions.

Comments: As program activities with key actor(s) initiate, task orders include identification of level of target behaviors currently adopted. During and after completion of activity, contractor/cooperating agencies are required by USAID/Mission and USAID/Global Bureau to follow on and request reporting from said key actor about adoption of target behaviors. Specific task order will compile reports from key actor(s) and compute indicator. This indicator is for USAID/Brazil Program management only and normally will not be reported in the R4 process.

Result 2.3: Increased availability and use of financing for clean and efficient energy production and use

Indicator 2.3.1: Clean and efficient energy projects under development that are funded by mechanisms created, leveraged or supported by USAID

Unit of Measure: Number of projects

Source: Project surveys, contractors, cooperating agencies and key actors

Indicator Description: The indicator shows clean and efficient energy projects that are actually being implemented, which are funded by mechanisms created, leveraged or supported by USAID. Eligible projects will be any “clean and efficient energy project” funded by mechanisms created, leveraged or supported by USAID. Examples of types of "mechanisms" USAID plans to create/leverage/support to provide funding are: promotion of USAID’s Development Credit Authority (DCA), technical assistance to the Brazilian Government on the preparation of loan requests, promotion of the developers' portion of cooperators cost-shares funds, etc. The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.”

Comments: A project will be considered "leveraged" by USAID when USAID directly participates in the process of achieving a result, by providing technical assistance, guarantees, or other inputs. This indicator will be measured through Mission’s internal reports, contractors/cooperating agencies periodic reports, key actor’s reports, and project’s surveys. This indicator plans to measure the initial impact of funds made available for clean energy projects as a result of USAID interventions, however it is important to note that there may be time lags between creation of funding mechanisms such as World Bank loans and actual project implementation. Moreover, when analyzing this indicator it is also important to consider macroeconomics assumptions as they could strongly influence the feasibility of projects. This indicator is non-cumulative.

Indicator 2.3.2: Non-USAID funds influenced or leveraged to develop renewable energy, energy efficiency, or other clean energy projects, as a result of USAID activities

Unit of Measure: U.S. Dollars

Source: Project surveys, contractors, cooperating agencies and key actors

Indicator Description: The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.”

Comments: Non-USAID funding value influenced by its activities (e.g., portions of World Bank loans, the developers' portion of REPSO cost-shares, etc.), GOB funds made available under the influence of USAID. This indicator is for USAID/Brazil Program management only and normally will not be reported in the R4 process.

Result 2.4: **Increased technology cooperation between U.S. and Brazilian firms for clean and efficient energy production and use**

Indicator 2.4.1: Cooperation initiatives (pilot programs, research/development delegations or other cooperation initiatives) that facilitated the application of clean and efficient energy technologies and know-how under Brazilian conditions

Unit of Measure: Number of cooperation initiatives

Source: Contractors, cooperating agencies, and key actors

Indicator Description: Cooperation initiatives are defined as pilot programs, research/development delegations, cooperative agreements between American and Brazilian organizations, U.S.-Brazil industry partnerships, executive exchanges, internships, etc. The cooperation initiatives to be counted are those: (i) directly or indirectly supported by USAID; (ii) targeted to promote “clean and efficient energy production and use”. Under specific Brazilian circumstances, indigenous energy resources, and necessary least-cost competitive approaches, various generation technologies are available, including small hydro, solar, biomass, wind and others. The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.”

Comments: Positive examples of new clean energy business opportunities must exist before the market at large will respond. Technology cooperation will facilitate the development of seed projects. The Mission has identified few opportunities for clean energy business opportunities in Brazil and Mission’s support is subject to funds availability. This indicator will be measured through Mission’s internal reports, contractors/cooperating agencies periodic reports, key actor’s reports, and project’s surveys. This indicator is non-cumulative.

Indicator 2.4.2: Clean and efficient energy projects of key actors, or influenced by key actors, which benefited from USAID/Brazil funded cooperation initiatives

Unit of Measure: Number of projects

Source: Contractors, cooperating agencies, and key actors

Indicator Description: The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.” Under specific Brazilian circumstances, indigenous energy resources, and necessary least-cost competitive approaches, various generation technologies are available, including small hydro, solar, biomass, wind and others. Key actors are the Ministry of Mines and Energy, PRODEEM/MME, PROCEL/MME, Energy Service Companies, Brazilian National Association for Energy Service Companies (ABESCO), Energy Efficiency Agencies or Institutes, MME's Centers of Excellence and related universities, National Research Center for Power Research (CEPEL), investor and public owned power utilities (concessionaires), rural cooperatives, power permissionaires, NGOs, Renewable Energy Developers and their associations, ANEEL and selected State regulatory agencies, selected development and commercial banks and financial/investment institutions.

Comments: This indicator is for USAID/Brazil Program management only and normally will not be reported in the R4 process.

Appendix V-A: STRATEGIC OBJECTIVE 2: Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use

STRATEGIC OBJECTIVE 2: Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use.						
APPROVED:			COUNTRY/ORGANIZATION: USAID/Brazil			
Result:	Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use.					
Indicator 1:	Incorporation of concepts, methods, and technologies for clean and efficient energy production and use in the operations of key actors.					
Unit of Measure:	Number of key actors who have met in 60 percent of their annual benchmarks.					
Source:	Contractors, cooperating agencies and key actors.					
Year	1998	1999	2000	2001	2002	2003
Target	Baseline	2	1	2	2	2
Actual	0					
<p>Indicator Description: Indicator will be the number of key actors who have met in that year 60 percent of their annual benchmarks for adopting clean and efficient energy production and use. Key actors may include the Ministry of Mines and Energy, PRODEEM/MME, PROCEL/MME, Energy Service Companies, Brazilian National Association for Energy Service Companies (ABESCO), Energy Efficiency Agencies or Institutes, MME's Centers of Excellence and related universities, National Research Center for Power Research (CEPEL), investor and public owned power utilities (concessionaires), rural cooperatives, power permissionaires, NGOs, Renewable Energy Developers and their associations, ANEEL and selected State regulatory agencies, selected development and commercial banks and financial/investment institutions. The term "clean and efficient energy production and use" is interpreted as "any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases."</p> <p>Comments: As activities initiate with each key actor, task orders will include definition of annual program benchmarks for adopting clean and efficient energy production and use. Points within the actor's annual plan that relate to adoption of clean and efficient energy production and use (within the limit of one year, after activities are initiated) will be identified by key actor and contractor/cooperating agencies. In the case that actor does not have a defined annual plan, a set of realistic benchmarks will be set. Contractors/cooperating agencies will be required by USAID/Mission to check achievement of benchmark entries by following on and requesting information to said key actor. A systematic follow-up system has been developed by the Mission and will include contractors/cooperating agencies periodic reports and a backup supporting matrix, which will have a list of specific benchmarks and targets by key actor. This indicator is non-cumulative.</p>						

STRATEGIC OBJECTIVE 2: Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use.

APPROVED:

COUNTRY/ORGANIZATION: USAID/Brazil

Result 2.1: Targeted policies promoted that foster clean and efficient energy production and use.

Indicator 2.1.1: Advancement of policies and regulations by key actors that contribute to the adoption of concepts, methods, and technologies for clean and efficient energy production and use.

Unit of Measure: Number of steps accomplished in policy formation.

Source: Contractors, cooperating agencies and key actors.

Year	1998	1999	2000	2001	2002	2003
Target	Baseline	2	2	2	2	3
Actual	0					

Indicator Description: Steps are defined as: identification, analysis, development, validation, promotion, training, adoption, implementation and enforcement. The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.” Key actors may include the Ministry of Mines and Energy, PRODEEM/MME, PROCEL/MME, Energy Service Companies, Brazilian National Association for Energy Service Companies (ABESCO), Energy Efficiency Agencies or Institutes, MME’s Centers of Excellence and related universities, National Research Center for Power Research (CEPEL), investor and public owned power utilities (concessionaires), rural cooperatives, power permissionaires, NGOs, Renewable Energy Developers and their associations, ANEEL and selected State regulatory agencies, selected development and commercial banks and financial/investment institutions.

Comments: Targeted policies (inclusive of private sector firms’ corporate policies, or utilities’ policies) and regulations (Federal and State) will be identified in task orders and cooperators working plans. Elements of policies/regulations that foster clean and efficient energy production and use may also be considered as targets for this indicator. Contractors/cooperating agencies will be required by USAID/Mission to check achievement of benchmark entries by following on and requesting information to said key actor. A systematic follow-up system has been developed by the Mission and will include contractors/cooperating agencies periodic reports and a backup supporting matrix, which will have a list of target policies and steps achieved. This indicator is non-cumulative.

STRATEGIC OBJECTIVE 2: Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use

APPROVED:

COUNTRY/ORGANIZATION: USAID/Brazil

Result 2.2: Increased access of key actors to information on market-based mechanisms for operating and financing clean and efficient energy production and use

Indicator 2.2.1: Key actors using market-based mechanisms to operate and/or finance clean and efficient energy production and use

Unit of Measure: Percentage (%)

Source: Contractors, cooperating agencies and key actors

Year	1997	1998	1999	2000	2001	2002
Target	Baseline					
Actual						

Indicator Description: The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.” Key actors are the Ministry of Mines and Energy, PRODEEM/MME, PROCEL/MME, Energy Service Companies, Brazilian National Association for Energy Service Companies (ABESCO), Energy Efficiency Agencies or Institutes, MME's Centers of Excellence and related universities, National Research Center for Power Research (CEPEL), investor and public owned power utilities (concessionaires), rural cooperatives, power permissionaires, NGOs, Renewable Energy Developers and their associations, ANEEL and selected State regulatory agencies, selected development and commercial banks and financial/investment institutions.

Comments: As program activities with key actor(s) initiate, task orders include identification of level of target behaviors currently adopted. During and after completion of activity, contractor/cooperating agencies are required by USAID/Mission and USAID/Global Bureau to follow on and request reporting from said key actor about adoption of target behaviors. Specific task order will compile reports from key actor(s) and compute indicator. This indicator is for USAID/Brazil Program management only and normally will not be reported in the R4 process.

STRATEGIC OBJECTIVE 2: Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use.

APPROVED:

COUNTRY/ORGANIZATION: USAID/Brazil

Result 2.3: Increased availability and use of financing for clean and efficient energy production and use.

Indicator 2.3.1: Clean and efficient energy projects under development, which are funded by mechanisms created, leveraged or supported by USAID.

Unit of Measure: Number of projects.

Source: Project surveys, contractors, cooperating agencies and key actors.

Year	1998	1999	2000	2001	2002	2003
Target	Baseline	1	1	2	2	2
Actual	0					

Indicator Description: The indicator shows clean and efficient energy projects that are actually being implemented, which are funded by mechanisms created, leveraged or supported by USAID. Eligible projects will be any “clean and efficient energy project” funded by mechanisms created, leveraged or supported by USAID. Examples of types of "mechanisms" USAID plans to create/leverage/support to provide funding are: promotion of USAID’s Development Credit Authority (DCA), technical assistance to the Brazilian Government on the preparation of loan requests, promotion of the developers' portion of cooperators cost-shares funds, etc. The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.”

Comments: A project will be considered "leveraged" by USAID when USAID directly participates in the process of achieving a result, by providing technical assistance, guarantees, or other inputs. This indicator will be measured through Mission’s internal reports, contractors/cooperating agencies periodic reports, key actor’s reports, and project’s surveys. This indicator plans to measure the initial impact of funds made available for clean energy projects as a result of USAID interventions, however it is important to note that there may be time lags between creation of funding mechanisms such as World Bank loans and actual project implementation. Moreover, when analyzing this indicator it is also important to consider macroeconomics assumptions as they could strongly influence the feasibility of projects. This indicator is non-cumulative.

STRATEGIC OBJECTIVE 2: Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use

APPROVED:

COUNTRY/ORGANIZATION: USAID/Brazil

Result 2.3: Increased availability and use of financing for clean and efficient energy production and use

Indicator 2.3.2: Non-USAID funds influenced or leveraged to develop renewable energy, energy efficiency, or other clean energy projects, as a result of USAID activities

Unit of Measure: U.S. Dollars

Source: Project surveys, contractors, cooperating agencies and key actors

Year	1997	1998	1999	2000	2001	2002
Target	Baseline					
Actual						

Indicator Description: The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.”

Comments: Non-USAID funding value influenced by its activities (e.g., portions of World Bank loans, the developers' portion of REPSO cost-shares, etc.), GOB funds made available under the influence of USAID. This indicator is for USAID/Brazil Program management only and normally will not be reported in the R4 process.

STRATEGIC OBJECTIVE 2: Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use

APPROVED:

COUNTRY/ORGANIZATION: USAID/Brazil

Result 2.4: Increased technology cooperation between U.S. and Brazilian firms for clean and efficient energy production and use.

Indicator 2.4.1: Cooperation initiatives that facilitated the application of clean and efficient energy technologies and know-how under Brazilian conditions.

Unit of Measure: Number of cooperation initiatives.

Source: Contractors, cooperating agencies, and key actors.

Year	1998	1999	2000	2001	2002	2003
Target	Baseline	2	2	3	4	4
Actual	0					

Indicator Description: Cooperation initiatives are defined as pilot programs, research/development delegations, cooperative agreements between American and Brazilian organizations, U.S.-Brazil industry partnerships, executive exchanges, internships, etc. The cooperation initiatives to be counted are those: (i) directly or indirectly supported by USAID; (ii) targeted to promote “clean and efficient energy production and use”. Under specific Brazilian circumstances, indigenous energy resources, and necessary least-cost competitive approaches, various generation technologies are available, including small hydro, solar, biomass, wind and others. The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.”

Comments: Positive examples of new clean energy business opportunities must exist before the market at large will respond. Technology cooperation will facilitate the development of seed projects. The Mission has identified few opportunities for clean energy business opportunities in Brazil and Mission’s support is subject to funds availability. This indicator will be measured through Mission’s internal reports, contractors/cooperating agencies periodic reports, key actor’s reports, and project’s surveys. This indicator is non-cumulative.

STRATEGIC OBJECTIVE 2: Increased adoption by key actors of concepts, methods, and technologies for clean and efficient energy production and use

APPROVED:

COUNTRY/ORGANIZATION: USAID/Brazil

Result 2.4: Increased technology cooperation between U.S. and Brazilian firms for clean and efficient energy production and use

Indicator 2.4.2: Clean and efficient energy projects of key actors, or influenced by key actors, which benefited from USAID/Brazil funded cooperation initiatives

Unit of Measure: Number of projects

Source: Contractors, cooperating agencies, and key actors

Year	1997	1998	1999	2000	2001	2002
Target	Baseline					
Actual						

Indicator Description: The term “clean and efficient energy production and use” is interpreted as “any market-oriented and sustainable generation process or appropriate end-use of energy that implies close-to-zero or less-than-zero emission of green house gases.” Under specific Brazilian circumstances, indigenous energy resources, and necessary least-cost competitive approaches, various generation technologies are available, including small hydro, solar, biomass, wind and others. Key actors are the Ministry of Mines and Energy, PRODEEM/MME, PROCEL/MME, Energy Service Companies, Brazilian National Association for Energy Service Companies (ABESCO), Energy Efficiency Agencies or Institutes, MME's Centers of Excellence and related universities, National Research Center for Power Research (CEPEL), investor and public owned power utilities (concessionaires), rural cooperatives, power permissionaires, NGOs, Renewable Energy Developers and their associations, ANEEL and selected State regulatory agencies, selected development and commercial banks and financial/investment institutions.

Comments: This indicator is for USAID/Brazil Program management only and normally will not be reported in the R4 process.

RESULTS FRAMEWORK - USAID/Brazil SO2
USAID/Brazil
Clean and Efficient Energy
Strategic Objective

