URUGUAY
UY- Energy Efficiency

GEF Project Brief

Latin America and Caribbean Region
PA9SS

Date: March 31, 2003
Sector Manager: Danny Leipziger
Country Manager/Director: Axel van Trotsenburg
Project ID: P068124
Focal Area: G

Team Leader: Nelson De Franco
Sector(s): Renewable energy (80%), Power (20%)
Theme(s): Climate change (P), Infrastructure services for private sector development (P), Pollution management and environmental health (P)

Project Financing Data

[ ] Loan [ ] Credit [X] Grant [ ] Guarantee [ ] Other:

For Loans/Credits/Others:
Total Project Cost (US$m): $81.00 **Cofinancing:**
Total Bank Financing (US$m): $14.5
Has there been a discussion of the IBRD financial product menu with the borrower? ☐ **Yes** ☐ **No**

Financing Plan (US$m): Source	Local	Foreign	Total
BORROWER/RECIPIENT	35.62	24.00	59.62
IBRD	9.50	5.00	14.50
GLOBAL ENVIRONMENT FACILITY	4.58	2.30	6.88
Total:	49.70	31.30	81.00

Borrower/Recipient: UTE - ADMIN. NACIONAL USINAS Y TRANS.
Administración Nacional de Usinas y Transmisiones Eléctrica (UTE)
Responsible agency: ADMINISTRACIÓN NACIONAL DE USINAS Y TRANSMISIONES ELÉCTRICA
Administración Nacional de Usinas y Transmisiones Eléctrica (UTE)
Address: Palacio de la Luz - Paraguay 2431, Montevideo
Contact Person: Ms. Sylvia Frid
Tel: (5982) 209 - 7685 Fax: (5982) 208 - 0708 Email: sfrid@ute.com.uy

Project implementation period: Project implementation period: 48 months. Expected effectiveness date: October 2003. Expected closing date: October 2007.

A. Project Development Objective

1. Project development objective: (see Annex 1)

The objective of the Uruguay Energy Efficiency (EE) Project is to increase consumer-driven demand for, and competitive supply of, energy efficient goods and services. To meet its objective, the project will (a) support the Government of Uruguay (GOU) in creating the enabling framework for the development of the EE market, and (b) stimulate the development of the market by facilitating the availability and acquisition of energy efficient goods and services, making them also more accessible to the poor.

Performance indicators for evaluating progress during project implementation include:

For *Development Objectives*:

- Market share of energy efficient equipment and appliances
- Emergence of local ESCOs.

For *Implementation Progress*:

- EE policy adopted and related legislation (including labeling) enacted
- Market transformation indicators (actual versus baseline)
- Number of projects reaching financial closure
- Sales volume of energy efficient equipment and appliances
- Number of ESCO projects generated, including sales volume and co-financing mix
- Number of low income beneficiaries
- Energy savings achieved

2. Key performance indicators: (see Annex 1)

The project's global objective is to overcome the barriers of: (a) lack of capacity and know-how among stakeholders; (b) lack of consumer-driven demand; and (c) lack of project development and investment financing. Performance indicators for the global objective include:

- Number of trained stakeholders
- Market acceptance of ESCO's offering
- Amount of co-financing from private stakeholders
- Carbon savings achieved

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)
Document number: 20355-UR **Date of latest CAS discussion:** May 5, 2000

The CAS supports the strategy of the GOU aimed to enhance competition, encourage private sector participation, diversify fuel sources, protect the environment, support programs and technologies aimed at the efficient supply and use of energy, and facilitate access of the poor to basic infrastructure. As indicated in the CAS, the energy sector in Uruguay seeks to keep pace

with cost reductions in neighboring countries in order to improve the competitiveness of the productive sector. The CAS also anticipated that the implementation of the ongoing Power Transmission and Distribution project creates an opportunity for pursuing energy efficiency activities, with the support of the proposed GEF grant.

The project will support these objectives by:

- Promoting energy efficiency and environment protection by addressing market and strengthening institutional capacity
- Supporting energy savings among residential and commercial users by facilitating availability and acquisition of EE equipment and services
- Increasing the productivity of the economy by reducing energy intensity
- Reducing the exposure of the economy to external shocks by reducing its dependence to imported fuels
- Enhancing competition in the energy market with private sector participation by supporting the activity of emergent ESCOs
- Improving access of the poor to EE goods and services
- Helping to integrate the EE concept in the reformed regulatory framework for the energy sector

1a. Global Operational strategy/Program objective addressed by the project:

The strategic goal of the proposed EE Project, namely the removal of barriers to EE, is fully consistent with GEF Operational Program No. 5, the objective of which is to disseminate least economic cost, energy-efficient technologies and promote more efficient use of energy. The Project is also consistent with the GEF strategy to leverage financing from other public and private sources to increase financing for EE investments and is in harmony with the policies of the GOU aimed to improve the competitiveness of its economy by improving the efficiency of energy supply and use. As a signatory to the United Nations Framework Convention on Climate Change, Uruguay has identified areas of opportunity to answer the Kyoto Protocol's call for intensified national efforts to implement low-cost greenhouse gas (GHG) mitigation measures. These include abatement of carbon dioxide emissions through energy efficiency and conservation. This Project intends to reduce GHG emissions by (a) creating the enabling framework for making available energy efficient goods and services through a standards, testing, and labeling program and an utility-based ESCO (USCO) and ESCO-development initiative, and (b) facilitating the acquisition of the above goods and services by consumers, to jump start the EE market. A rural electrification program included in the Project, aimed to provide modern energy to isolated rural population through the provision of Solar Home Systems (SHS) under an USCO-based arrangement, is consistent with GEF Operational Program No. 6.

2. Main sector issues and Government strategy:

To accelerate overall economic development, Uruguay seeks to improve its overall economic efficiency and industrial competitiveness. As an essential part of this task the GOU wants to reduce the cost of energy in the production of goods and services – energy prices in Uruguay are

in the upper end of regional levels. Uruguay is moving from a relative economic isolation to a new era of economic competition and regional market integration, including in the energy sector. One consequence of the past relative isolation is that the energy-consuming capital stock is of relatively low energy efficiency. However, much of these energy consuming goods and equipments will be replaced in the process of modernization launched by the GOU, as Uruguay adjusts to competitive forces and adapts to the introduction of natural gas in the country's energy matrix and to the new regulatory framework in the power sector, this new framework aims to promote regional integration and increase competition and private sector participation.

In June 1997, Uruguay's Congress approved an Energy Law that encourages private sector companies to enter the power generation and commercialization market to secure sufficient power for competitive growth. Since then, the details of the framework have been codified in a series of decrees and regulations, and as of March, 2003, this new framework is in effect. In the new regulatory context, energy produced by private companies may be used for local consumption, or exported through the state-owned grid to Argentina and Brazil. Currently, UTE, the state-owned electric utility has approximately 2,200 MW of installed capacity. Four hydroelectric plants represent approximately 70 percent of this (1,534 MW) with the remaining 30 percent produced by oil, diesel, coal, and firewood. However, the main thermal electric generation facilities in Uruguay, which utilize fuel oil, have low thermal efficiencies, and produce emissions in urban zones with negative effects on local air quality and the global environment. Since all of Uruguay's large-scale hydroelectric potential has been exploited, the new generation capacity needed to meet the projected 3 percent annual demand growth over the next decade will rely increasingly on fossil-fired technologies with some renewable energy participation. Furthermore, peak load in the system is now about 1,450 MW, and will continue to grow, making the use of existing and new thermal capacity increasingly important to the system. Imported natural gas is expected to play a significant role in electricity production. Government planners estimate that up to 850 MW of new gas-fired power generation capacity could be built by private companies within a decade. In the near term, however, the country's financial crisis will limit its ability to finance public-sector capacity and will diminish its attractiveness as a location for investment by private producers. The first contract between UTE and a private producer, which was expected in 2002, has not been signed.

The new regulatory framework contains many advances in the area of private generation, with respect to tariff-setting, open access for private generators to the transmission and distribution networks, wheeling fees, and, while the regulations do not address the subject specifically, availability of backup supplies for cogenerators does not appear to be proscribed. There are, however, numerous areas where the new framework could be improved to promote energy efficiency more effectively. Specifically, the regulatory framework does not provide the basis for integrated resource planning (IRP). Nor is there any mechanism to collect a fee on the ratepayer's bill to capitalize a fund for energy efficiency programs. Nor do the regulators appear to have given any thought to modifying the tariff regime to create the appropriate incentives for efficiency. Further, the arrangements governing back-up power supplies for private generators are not yet explicit on the subject. Finally, the stipulation at present that transmission fees are to be calculated in dollars introduces another element of uncertainty for private generators.

The main sector issues reflect the need to: (i) expand power generation capacity to meet the

increasing demand in a sustainable way and moderate the expected rapid growth of thermal-based generation capacity, with associated environmental impact; (ii) improve the efficiency of the energy market to reduce costs, displace some of the new capacity requirements and improve sustainability; (iii) moderate the predominant participation of residential consumption in the power sector (44 percent) and its large role in peak demand, which is partially met with low-efficiency generation; (iv) supply the dispersed rural population with modern energy; and (v) improve the energy efficiency of the economy to reduce energy imports, mitigate external price shocks, and fulfill its international commitments to reduce global emissions.

The sectoral strategy of the GOU is to (i) expand power generation capacity using natural gas imported from Argentina, instead of liquid fuels and, eventually, convert existing fuel-oil fired power generation to natural gas to reduce costs and emissions; (ii) accelerate development of a regulatory framework aimed to reform public utilities, introduce competition in power generation through the creation of a wholesale power market (WPM) and private sector participation in the construction and ownership of new power generation plants. The electricity regulatory agency, URSEA (formerly UREE), is now drafting regulations to implement this legislation; (iii) increase participation in regional energy trade, (iv) develop the natural gas market by the private sector; (v) introduce public/private partnerships in the oil business; (vi) promote competition among various energy sources; and (vi) improve the efficiency of energy use by facilitating availability and acquisition of energy efficient goods and service.

The potential for energy savings and GHG emissions reduction is significant, considering the low penetration of efficient technology in the Uruguayan energy market and the fact that growth in electricity supply will be generated thermally. In the *industrial sector*, it is estimated that replacement of inefficient technologies still in use could reduce current energy consumption by 5 to 10 percent in the medium-term. More significant savings and efficiency gains – of up to 20 percent – can be obtained in specific cases by switching to nanatural gas. In addition, cogeneration potential of at least 40 MW exists in the pulp and paper, textiles, leather, and food processing sectors. Taken together, total energy savings in industry of 49 kTPE or 11 percent are achievable. Switching to natural gas would reduce emissions of local pollutants as well as greenhouse gases. In the *commercial sector*, according to surveys conducted by UTE, current use of new, efficient technologies for illumination, heating and air conditioning, refrigeration and water heating is relatively limited. Total savings on the order of 3 percent could be obtained through various types of measures. In the *residential sector*, there are significant opportunities in the areas of lighting, water heating, and appliances. With respect to lighting, for example, 89 percent of lamps are incandescent and only 11 percent are fluorescent. Total savings of 6 kTPE or 1 percent are achievable. Finally, in the government sector, opportunities in areas such as street lighting derive from the presence of inefficient mercury vapor lamps, which constitute 95 percent of the total.

A recent analysis of potential savings in four segments of the Uruguayan economy estimated total technically and economically achievable savings of about 177 GWh annually in electricity, equivalent to almost 3 percent of UTE's current sales. In addition, the study identified savings in fuel consumption in the industrial sector equivalent to 6 percent of primary energy consumption in the sector, while an additional 6 percent could be obtained from implementation of

cogeneration projects in the sector. In sum, total savings of approximately 63 kTPE annually, or 4 percent of total, non-transportation primary energy consumption, are achievable. It should be noted that the engineering assessments on which these estimates are based were deliberately conservative, based only the most economically attractive opportunities. These results are summarized in Table 1.

Table 1: Summary of energy savings potential

Sector	Fuels (kTPE)	Electricity (GWH)	Cogeneration Potential (GWH)	Net Savings Primary Energy (kTPE)*	Total Primary Energy Use (kTPE)**	Savings
Industrial	26	108	286	49	452	11%
Residential		31		6	711	1%
Commercial	2	32		6	198	3%
Governmental		7		1	N/A	N/A
Total	29	177	286	63	1,554	4%

* Electricity consumption converted to kTPE based on assumed thermal efficiency of 41% (based on UTE data), and 11.94 MWHt per metric ton crude oil, yielding 4.9 MWHe per metric ton crude oil. Net savings in cogeneration are estimated at 1.11 kWHt/kWHe. The calorific value of crude oil is assumed to be 43,000 MJ/metric ton. ** Total shown reflects non-transportation segments of total primary energy consumption. In 2001, total primary energy consumption was 2,350 kTPE, of which 34% represented transportation consumption. Data from MIEM, *Balance Energético 2001*.

An analysis of the market for appliances for residential and commercial use, space heating and cooling systems, electric motors, insulation, and illumination for residential and municipal applications suggests that the most significant opportunities lie in the area of residential and commercial lighting, followed by electric motors for industrial and commercial use, and freezers and refrigerators for residential and commercial applications. This assessment, which is presented in greater detail in the Technical Annex, reflects the importance of lighting in the evening peak, which begins about 17:00 and tapers off around midnight. The potential savings from improvements in efficiency in each of these areas, as well as other areas not ranked as high on the list of priorities, depend on the degree of penetration achieved by efficient technologies in each area. If higher levels of penetration can be achieved, the analysis suggests that annual electricity consumption savings in excess of the figure given above could be achieved.

On the *energy supply side*, the installation of combined-cycle generation equipment powered by natural gas, to replace fuel oil and diesel, offers possibilities for reduction of incremental CO2 emissions. Improvements in the electricity transmission and distribution networks would also contribute to reduce losses and conserve energy. *Demand-side management measures*, particularly in the residential and commercial sectors, have potential, not only to improve UTE's load factor, but also to reduce technical and commercial losses and postpone new generation and transmission requirements. Additionally, the expanded utilization of time-of-use tariffs, currently with limited application, could reduce the system's peak load demand.

Emissions reductions from a labeling program increase dramatically over time as saturations increase. As Table 2 shows, the total CO2 emissions reductions from labeling would be around 1.1 mt per year in 10 years and it would be nearly twice that in 15 years. These preliminary estimates, based on an analysis of the existing market and product stocks, assume that penetrations will increase at a moderate pace.

Table 2: Summary of savings and GHG emission reductions from a labeling program

Product	5 Year Savings	10 Year Savings	15 Year Savings	10-Year Annual Average	10 Year GHG Emission Reduction
	GWH	GWH	GWH	GWH/year	mT CO_2
Residential Lighting	-92.8	-340.3	-742.5	-34.0	-0.14
Water Heater	-64.5	-236.4	-515.8	-23.6	-0.09
Refrigerator	-21.7	-79.4	-173.3	-7.9	-0.03
Air Conditioning	-5.8	-21.4	-46.7	-2.1	-0.01
Freezer	-25.0	-91.7	-200.0	-9.2	-0.04
Commercial Lighting	-169.6	-622.0	-1,357.1	-62.2	-0.25
Electric Motors	-367.9	-1,348.8	-2,942.9	-134.9	-0.54
Total	-747.3	-2,740.1	-5,978.3	-274.0	-1.10
Note: Estimates for 5-, 10- and 15-year savings are based on increasing penetration of efficient products. See Annex A for detailed assumptions.					

To ensure that these energy efficiency opportunities are captured, the GOU wants to overcome the principal barriers to broader utilization of energy efficient technologies and practices in the Uruguayan marketplace. The GOU strategic approach consists in creating an enabling environment for EE activities and facilitating initial investments in the acquisition of energy efficient goods, the delivery of energy-saving services and, in the case of the rural sector, the delivery of electric service to communities that currently are not connected to the national grid. The market-oriented approach is incorporated in the proposed EE project. Interviews and research on Uruguay's industrial sector, as well as contacts with UTE, have indicated that there is a significant base of technical knowledge and interest among a now small number of entrepreneurs in providing energy efficiency services and implementing demand-side management activities. This suggests that a market-oriented strategy of achieving increases in energy efficiency is feasible.

3. Sector issues to be addressed by the project and strategic choices:

3a. Barriers to energy efficiency in Uruguay

The three major barriers to improving energy efficiency in Uruguay, as described below, are limited capacity and know-how among key stakeholders, lack of consumer-driven demand, and most importantly, lack of project development and investment financing:

Limited capacity and know-how among key stakeholders. Information on the effectiveness and sustainability of energy efficiency measures is not widely available in Uruguay. Only limited information is available on best practices and financial benefits of EE measures or the ways to structure, finance, and operate ESCO-based saving initiatives. In the few cases where some information is available, the mechanisms for disseminating information to users, policymakers, and regulators have not been widely used until recently. Regarding demand-side management measures, there is a need to verify the benefits of curbing peak demand, vis-à-vis the potential reduction of electricity sales.

At the same time, Uruguay's industrial and services sectors do have some experience with energy efficiency and performance contracting as a mechanism for investing in savings. There are at least two ESCOs operating in the country at present. One has specialized in industrial projects, and is just beginning to disseminate information on its offering through an alliance with LATU. The other has focused on the hotel sector, and while it appears to be known to leading hoteliers,

it has not achieved widespread familiarity. Both companies have only limited access to financing at present. The services of these ESCOs and newcomers to the market would likely be well received in the industrial and certain subsectors of the services sector, since the industrial sector, in particular, does have experience with performance contracting in the 1980s. At that time, a leading Uruguayan manufacturer of industrial boilers launched a very successful performance contracting offering to undertake projects to switch from fuel oil to wood, and deliver significant cost savings to the end-user. This business was widely publicized at the time and dried up when the price differential narrowed as a result of the government's change in taxes levied on industrial fuel oil.

Lack of consumer-driven demand. Public knowledge of potential benefits of using energy efficiency measures is limited, and the market does not provide customers with information aimed to facilitate energy savings and reduce emissions. While UTE has not engaged in any DSM activities to date, it has demonstrated that a consumer finance program for purchase of appliances would be well received. The so called SuperPlan program it implemented in 2000-2001 with financing provided by a local bank and repayment through the utility's monthly bill triggered a 14% increase appliance sales – but no energy efficiency criteria were applied. Rather, the objective of the program was to flatten out UTE's load curve as well as protect the utility's market in the long term. Nor do vendors of appliances and equipment provide information about annual operating costs of equipment or identify the most efficient units. Energy efficiency standards are lacking, as are testing, certification and labeling of electric equipment. As the only information available to customers is the initial purchase cost, vendors have no incentive to offer efficient equipment that may be more expensive to acquire but much less to operate. This is compounded with the limited availability of EE appliances and equipment in the market place.

An initial analysis of the Uruguayan appliance market shows that while consumers are price sensitive, incremental purchase costs for efficient appliances are quickly offset by energy bill savings. The net positive benefit accrues to consumers from the purchase of efficient products.

Lack of project development and investment financing. The high cost of designing and starting EE projects in Uruguay, and the lack of commercial financing for ESCO-based projects (due to the risks perceived by potential investors, suppliers, and final users from the adoption of EE initiatives) pose the most important obstacle to the emergence of an energy efficiency sector in the country. The infrastructure needed to provide technical assistance in project design, financing, implementation or verification does not exist; therefore each project becomes a prototype, adding considerably to costs. Further, the projects undertaken on a performance contracting basis to date have not received commercial financing: in the case of one of the existing ESCOs, company principals have used personal loans to secure funds; in the case of the boiler manufacturer, projects were always funded out of company resources.

The SuperPlan program, which generated $50 million in loans for 60,000 applicants in about two years, demonstrates that there is significant demand for consumer credit that could be channeled toward acquisition of efficient appliances. Lessons learned in this program will be applied to the proposed retail program aimed to sell energy efficient appliances.

In the rural sector, UTE has significant experience installing solar systems in public buildings,

such as schools, police stations, and clinics. Recent studies indicate there is demand for Solar Home Systems (SHS) for residential use in these areas, and survey suggest that a market-oriented approach could be applied to deliver the systems to the end-users. Extending SHS use to these residential users offers an economic savings and improvement in energy quality, as well as emissions reduction benefits, resulting from the displacement of more expensive sources of energy, including kerosene, batteries, LP gas and candles.

3b. Strategic choices

The proposed project aims to overcome the above barriers by supporting the GOU in (a) creating the enabling framework for making available energy efficient goods and services through a standards, testing, and labeling program and an utility-based ESCO (USCO) and ESCO-development initiative, and (b) facilitating the acquisition of the above goods and services by consumers, to jump start the EE market.

Choice of standards, testing, and labeling program to make available energy efficient goods and equipment. The combination of testing and labeling energy efficient products, voluntary and mandatory minimum efficiency standards, and market transformation efforts has become the cornerstone of successful energy efficiency programs in many countries. This model suits Uruguay because the country faces growing saturations of appliances and some of the existing capital stock is in need of replacement with newer more energy efficient technologies and appliances. In addition, effective standards and labeling can facilitate the appropriate switch to natural gas in the short term, to take advantage of natural gas availability. Improving the energy efficiency of products on the market will reduce costs and improve the productivity of the economy. In addition, the coordination of the proposed labeling program with similar programs under development and operation in the South-America Southern Cone Common Market (MERCOSUR) area will favor economic integration and regional trade. The activities of USCO are expected to serve as a catalyst for consumer, commercial, industrial and governmental purchases of energy-efficient equipment, since the advertising and promotion campaign it will undertake will include references to the energy consumption information disseminated through the program.

A labeling program, even with the attendant testing costs, is a very cost-effective way for the Uruguayan government to improve energy efficiency in the market. Based on an evaluation of the tax and tariff structure of the appliance market, it appears that such a program could be undertaken with a net benefit for GOU (with financing and support from GEF/WB). This analysis does not rely on savings based on the approximately 2.7 TWh freed up on the grid or peak load reductions leading to more manageable infrastructure investment.

Table 3: Ten-year summary of labeling program costs and tariff revenue impacts

Product	Tax and Tariff Rate*	Baseline Revenues	Test Capacity*	Labeling Program Costs**	Incremental Revenues	Net Costs
	% of sales value	US$ millions	US$ millions	US$ millions	US$ millions	US$ millions
Residential Lighting	0.28	0.96	0.30		1.93	(0.66)
Water Heater	0.24	3.35	0.27		3.74	(0.12)
Refrigerator	0.26	7.78			8.45	(0.67)
Air Conditioning	0.28	10.09			10.54	(0.45)
Freezer	0.23	2.69			3.20	(0.52)
Commercial Lighting	0.28	n/a			N/A	N/A
Electric Motors	0.25***	0.86			1.72	(0.86)
Misc. Costs			0.03	1.06		1.09
Total		25.72	0.60	1.06	29.57	(2.18)

*Tax and Tariff Rate based on 2001 sales and government revenues. ** Test Capacity and Labeling Program Costs include WB/GEF Financing and GOU In-kind costs. Labeling Program costs are for four years and include a retail promotion campaign separate from the USCO activities, as well as recurring and non-recurring costs. *** Tax and Tariff Rate for Motors is the average rate across all products.

Choice of ESCO mechanism to deliver EE services. The GOU proposes to promote the development of ESCOs to deliver EE services following energy performance contracting (EPC) principles. The proposed project supports the implementation of the GOU strategy by promoting development of ESCOs in two parallel tracks: within UTE, project funds will leverage UTE resources to create USCO; separately, a Uruguay Energy Efficiency Fund (UEEF) will provide debt and equity resources for the existing small and undercapitalized ESCOs, as well as new ventures launched by local engineering and construction firms. Consistent with UTE's work to date, and its technical capabilities, USCO will focus on the residential, small business, and government market segments, while the private ESCOs, which have more experience with efficiency enhancements in productive processes, will serve larger enterprises and industrial clients. The Project would only finance USCO and ESCO activities in these markets, to protect ESCO development. Once the private ESCOs and USCO have had a chance to grow and consolidate their businesses, the market segmentation will tend to disappear. The key to the capitalization and growth of the ESCOs and USCO will be implementation of EPC-based projects. Such projects create a partnership between the end-user, the lending bank, and the ESCO, all working towards to a common objective of reducing the consumer's utility costs. Such projects are cash-flow neutral and therefore do not result in incremental debt for the consumers, because the cost of the investments is repaid by the consumer's energy savings. The ESCO and/or the bank, not the consumer, makes the up-front investments, but the consumer receives at no risk the immediate facility improvement from the moment the project is implemented. These projects also create a risk sharing arrangement whereby the ESCO retains the technical performance risk and the bank underwrites the client-credit risk (which is the bank's core business). The projects contribute to the strengthening of the ESCO's balance sheet by creating assets that generate cash

flow during the lifetime of the contract, or may be sold off to generate additional cash for new investments.

Choice of UTE for Creating a Utility-Based ESCO (USCO). Today, there are only limited ESCO activities in Uruguay, and none by UTE. The rationale for starting the program on a two-track basis is to capitalize on UTE's strength, on the one hand, without stifling the nascent ESCO sector that is emerging, but requires capital and access to financing to grow and expand. UTE has expressed interest and commitment to creating USCO as a way of diversifying its service offering and enhancing consumer loyalty. USCO's strength will lie in its access to UTE's substantial operating experience, strong knowledge of its customer base, the benefits of energy saving opportunities from the utility point of view, and the financial strength of the parent utility that provides a comfort level to commercial banks in a path-breaking endeavor. Based on these strengths, and through initial EPC-based and consumer rebate projects, USCO will demonstrate the commercial sustainability of energy efficiency financing and show how stakeholders and beneficiaries can overcome technical and financial barriers to implementation.

A business plan has been prepared for USCO, based on the implementation of EPC-based projects for residential and commercial customers using IBRD loan funds to leverage USCO's equity base, composed of UTE and GEF-provided resources. USCO will also offer residential and commercial users rebates (using part of the GEF funds) if the customers choose to pay the balance of project cost in cash. The first projects in USCO's business plan will demonstrate the potential of USCO's service offering early in the project by building on UTE's technical expertise and customer base. Early successes will also contribute to creating new business opportunities and private sector interest and a greater likelihood of replicability of energy efficiency investments, because the initial successes begin building capacity in the form of financial and technical skills and know-how among the stakeholders. The business plan projects total investments of at least $4.9 million in the first four years, yielding energy savings of about 45,000 MWh.

Three stages in USCO's development are contemplated (paralleling the stages of private ESCO development noted below):

- Stage 1: Capitalization and organization of USCO (Year 0), involving internal development at UTE and the new business unit;
- Stage 2: Formation and early operation of USCO (Years 1-2), during which time the projects identified in its business plan are implemented and follow-on projects are developed, still in its core sectors (residential, small enterprises, and government);
- Stage 3: Consolidation of USCO (Years 2-4), during which time USCO will expand its coverage and implement new projects that build on the base established in Stage 2;
- Stage 4: Maturity (Years 4-6), at which point USCO may find it attractive to develop projects outside its core sectors, thereby entering into competition with the private ESCOs.

A financial model prepared for USCO's business plan projects that total sales will increase from

US$200,000 in Year 1 to US$1.5 million in Year 4, and a profit margin of 16% in Year 4, and interest coverage (EBITDA/interest) increasing from about 3 times in Year 2 to 12 times in Year 4. Over the four-year period, the equity value of USCO would increase to about US$2.2 million, based on a multiplier of four times EBITDA.

The approach adopted by UTE in delivering rural electricity has traditionally employed the utility's own resources to deliver this service. UTE intends to test a commercial approach, using USCO and individuals or entities in the rural communities themselves to provide residential service to the estimated 6,000 households in rural areas that lack grid-connected electricity.

The four-year SHS program included in the EE project consists of two phases. In each phase, 1,000 SHS will be installed, delivering electric service by the project's end to about one third of the homes identified. These two phases will lay the groundwork for a follow-on phase (Phase 3) in which additional systems would be purchased for installation in the remaining homes, using the same USCO-based model to be used during the GEF-supported EE project.

Each phase included in the EE project will be implemented by UTE's USCO through two bids: (i) for purchase of SHS packages and (ii) to select *rural energy service providers* (RSPs) who will install and maintain the systems acquired by UTE (with the participation of rural NGOs and rural institutions) for a period of five years under a leasing agreement. Each SHS recipient will pay a tariff of about US$10/month to (i) remunerate the services of the RSP and (ii) repay to UTE the subsidized cost of the SHS (US$615). Ownership of the SHSs would be transferred to the recipients after the five-year lease expires.

Subsidized installed cost was estimated to reduce monthly payment to the willingness-to-pay level. Total subsidy amount during Phase 1 of the Program would be US$275 (GEF: US$125, UTE: US$150), equivalent to a reduction of US$ 3 in monthly payments. The GEF subsidy of US$125 is the same as the one used in PERMER, an ongoing GEF-supported rural electrification project in Argentina. During Phase 2, a combination of expected cost reductions (US$ 50) and a subsidy of US$225 (UTE) would allow to keep service tariffs at the same level of Phase 1. No GEF contribution for SHS subsidies is considered during Phase 2; GEF contribution will be limited to support global project implementation through technical assistance. No GEF contribution is considered for Phase 3, as Phase 3 will be implemented after the EE Project.

Choice of markets. USCO's market for energy efficiency services includes residential housing, public and commercial buildings, municipal street lighting, and rural electricity service. USCO's initial project pipeline includes services in the municipalities of Ciudad de la Costa, Paysandú, Colonia del Sacramento, and San José de Mayo. These initial projects have been selected considering their potential replicability in the country and in the region, thereby helping create a self-sustaining market for energy efficient appliances and technologies. In parallel to USCO's efforts, the emerging private ESCO sector will serve the industrial and commercial sectors to a greater extent than it is already. By the end of the project implementation period (four years), the private ESCOs and USCO will have matured to the extent that will compete in

all areas of the market for energy efficiency equipment and services. This initial segmentation of the energy services market is expected to last through the initial phase of the sector's emergence because UTE, for its part, sees its strategic interest in addressing the needs of residential and small business customers and is likely to find it difficult to gain the trust and confidence of industrialists needed to identify energy efficiency opportunities through process enhancements and changes. For their part, many of the engineering and construction firms along with the existing proto-ESCOs already have or are rapidly developing the contacts and networks to market their services to the industrial sector and larger services businesses.

The labeling and retailing programs will facilitate availability and acquisition of efficient appliances in the residential, commercial and industrial markets, thereby amplifying the impact of the marketing activities of USCO and the ESCOs. Consumers are buying significant numbers of appliances and equipment, but because of first cost barriers, they often choose less efficient products. This ends up costing them money, but it is difficult for individual consumers to perform cost-benefit analysis using life-cycle costing. Labels, in particular, can help, while minimum standards eliminate the need to make the calculation by removing inefficient products from the market. The potential savings to individual consumers is not large enough alone to motivate purchase of more efficient products, but in aggregate, these savings represent a substantial benefit to the economy. See Table 4.

Table 4: Individual case for purchase of Energy Efficient Products

Product	Incremental Cost for Efficiency	Annual Energy Bill Savings from Efficiency	Present Value Savings (over product lifetime)	Simple Payback Period
	% of base cost	US$	US$	years
Air Conditioning Split	4%	$10.43	$82.83	3.5
Air Conditioning Conventional	4%		$82.83	2.7
Electric Water Heaters	12%	$21.90	$173.94	0.5
Natural Gas Water Heaters	-	-	$173.94	0.5
Freezers-horizontal	22%	$8.38	$384.29	1.7
Freezers-vertical	3%	$24.19	$192.15	0.5
Refrigerator with freezer	9%	$6.67	$60.77	5.9
Refrigerator one door	9%	$6.67	$60.77	3.4
CFL	855%	%5.94	$38.70	0.9

USCO's role in the implementation of the SHS program in rural areas is intended to test the commercial delivery mechanism as well simplify the delivery of the service, which would otherwise have to be provided by UTE at higher administrative, installation and maintenance costs.

Choice of a phase-in approach to supporting the private ESCOs. The private ESCOs will receive loans and equity capital from the UEEF, which will be capitalized initially out of the proceeds of the GEF grant to UTE. The UEEF will be housed at MIEM, and administered by a specially selected team with support from DINACYT, which has experience with managing

specialized funds for SMEs and for technological innovation.

UEEF's activities will evolve as the ESCOs it supports become stronger financially and make the transition to commercial sources of financing. Four stages of development are contemplated:

- Stage 1: Capitalization of UEEF (Year 0) and preparation of initial investments and loans (Year 1), involving the establishment of the Fund and initial operations;
- Stage 2: Formation and early operation (Years 1-2), during which initial transactions would be completed using the three financial instruments to support ESCOs and their EPC projects in various stages of development, primarily if not exclusively with industrial and large commercial clients;
- Stage 3: Consolidation of the ESCOs (Years 2-4), during which time UEEF will seek to increase the share of commercial lending in its portfolio, expand its resource base through access to commercial sources of financing, and qualify for an investment-grade rating, and the ESCOs, for their part, build up their balance sheets, and, to the extent they desire to expand their markets, do so in the governmental sector;
- Stage 4: ESCOs reach maturity (Years 4-6), at which point ESCOs have developed sufficiently to secure commercial financing, although they may still face some difficulties due to the perception of risk by the banks, or limited track records or other creditworthiness issues, making it more important for UEEF to serve as a source of credit enhancements than a source of liquidity per se; at this point, ESCOs may compete with USCO in USCO's primary markets (residential, smaller businesses, and government).

During the initial phase of operation, UEEF will support existing and emerging ESCOs with contingently recoverable loans, commercial loans and equity. This offering is needed to redress the chronic lack of access to financing facing ESCOs, which has only been compounded by the country's recent financial crisis. UEEF will offer loans in the one- to three-year range to focus the ESCOs' attention on small projects (in the $75,000 to $250,000 range) with quick paybacks in contracts with companies with strong hard-currency revenues in order to build up portfolios, establish ESCO creditworthiness and demonstrate UEEF's ability to recover its loans. Following this initial phase, UEEF and the ESCOs it will support will have to expand their sources of financing. UEEF will seek to do this by issuing a note to the pension funds (AFAPs), and onlending the proceeds to ESCOs that meet the appropriate investment criteria. Clearly, UEEF's ability to secure commercial resources will depend on the success with which it recovers loans (whether contingently recoverable or commercial) from the ESCOs. Meanwhile, UEEF's product mix will increase its emphasis on commercial loans as opposed to contingent lending. In the final phase, when energy efficiency finance is better understood in the financial sector and commercial banks are better able to gauge project and ESCO risk and lend to ESCOs for qualified projects, UEEF will begin assuming the role of loan guarantor more than lender, using its resources to secure loans to ESCOs on a partial-parity basis. However, this shift can only occur if the ability of the ESCOs to secure commercial loans has been demonstrated; if this is not the case, UEEF's niche will continue to include commercial lending.

The cash-flow model prepared for UEEF projects that a total of about $14 million in investments (contingent loans, commercial loans and equity investments) could be made in the

first four years of operation. Even though UEEF is a centerpiece of the project, the volume of lending and investment it is anticipated to achieve is likely to constitute only part of the total amount of investment in EE measures in the same period, since UEEF's activities will (i) encourage other financial institutions to lend to ESCOs and other project sponsors in business and industry and (ii) support project preparation that may be financed by the ESCO's client or another bank. Meanwhile, business and industry is likely to give more attention to EE investment as part of corporate investment programs, due to marketing of energy efficiency services by ESCOs and the impact of the standards and labeling program, and numerous companies may choose to finance turn-key EE projects themselves, and others that make investments in more efficient equipment through regular procurement of equipment.

Assuming that UEEF raises external financing to expand on the GEF-funded equity base, its greatest challenge will be to expand lending operations quickly to generate reflows to cover debt service. This would require it to increase average loan size and emphasize term lending as opposed to contingent lending, although this would remain an important instrument for generating deal flow. Even assuming a high default rate of 11% on term loans, and a more aggressive 33% closure rate on contingent loans, and a 15% net return on equity placements, UEEF could begin registering positive cash flow from operating activities.

Even if UEEF uses only the GEF capital allocated to it, financial projections suggest that it could operate for five years by drawing down its initial capitalization and covering operations and a part of lending activities out of cash flow from loans (even with a default rate of 11%), repayments of contingent loans (33% rate of closure), and a net 15% on equity placements, although its cash situation at the end of the period would be tight. After Year 5, it would begin to rebuild its capital base with net positive cash flow from operating activities. However, in contrast to the strategy employed using external resources, UEEF would have to reduce sharply the overall level of contingent lending in order to survive.

This phased approach is needed at the present time because of the severe constraints on liquidity in the financial sector since the onset of Uruguay's economic crisis in mid-2002 make it impossible for banks to lend to any but the most well-understood projects with strong companies (and sparingly even in such cases) in the near-term. Ironically, there is significant liquidity in the pension funds that cannot be invested in companies and funds outside of Uruguay, but must be placed in companies and funds that enjoy an investment-grade rating. Currently, treasury obligations and bonds of the central bank and Uruguay's main mortgage bank make up over 70% of the pension funds' portfolios; fund managers have indicated their desire to buy corporate paper and have expressed interest in the UEEF. Access to these and other commercial resources is essential to the evolution of UEEF and the ESCOs into sustainable businesses and to the mainstreaming of energy efficiency technologies and performance contracting in Uruguay.

Choice of association with IBRD projects. The proposed GEF-financed EE Project is associated to the ongoing IBRD-financed Transmission and Distribution (T&D) project (Loan 3959-UY). The T&D project comprises a demand-side management program for UTE, which will be enhanced by the introduction of market-based mechanisms envisaged under the EE

project. This association will improve the likelihood of success and sustainability of the overall IBRD/GEF operation.

Choice of funding mechanisms. Funding mechanisms were designed to address the barriers specific to each activity supported by the project:

- The ***IBRD loan*** will co-finance USCO activities, as well as the other EE activities to be performed by UTE.

- The proposed ***GEF Grant*** will be channeled through the following funding mechanisms:

  - *GEF technical assistance grant* will support (a) capacity building activities aimed at stakeholders, including energy users, energy suppliers, energy service providers – USCO and ESCOS, commercial banks, policy makers, regulators, non-government organizations (NGOs) and educators, (b) monitoring, evaluation, documentation and dissemination of best practices, technical guidelines, and cases of success, and (c) standards, testing and labeling program.

  - *GEF-funded contingent grants* administered by UEEF will support pipeline and project development by the emerging ESCOs. This mechanism will address current lack of funding in the market for development costs (such as feasibility studies), and will promote increased project development activities. The provision of early funding can contribute to the development of UEEF since projects reaching financial closure will be able to repay the contingent loans, permitting UEEF to extend the reach of the program beyond the projects initially developed. Recovered funds will be re-applied to other development activities. Moreover, such activities will deepen learning and financial know-how among the ESCOs.

  - *GEF grants used as equity ("equity financing")* will partially support the investment implementation component to be co-financed by other stakeholders, including commercial banks. In the case of USCO, the equity grant by GEF will be complemented by an investment by UTE, and leveraged by use of the IBRD loan resources. In the case of UEEF, its initial capitalization will consist of GEF resources, but the income generated through lending activities will enable it to operate sustainably into the future. Its ability to expand its activities, will depend on its ability to recover loans, and success in obtaining an investment-grade rating. Exit strategies for the equity investments will be developed such that returns on investments will cover management costs of the equity funding mechanisms, and returned capital can be recycled for future investments. Activities to be funded include retailing of EE goods and provision of EE services by USCO and emerging ESCOs. The GEF grant will be allocated between USCO and the UEEF, and these resources will be used as follows:

- The portion of the GEF equity grant allocated to USCO will create a rebate fund to encourage customers to purchase efficient equipment by covering the required down

payment, provided that the balance of the project cost is paid in cash. USCO will also use this equity, leveraged with debt from the IBRD loan to UTE (and, in the medium- to longer-term, financing from commercial banks and supplier credits), to finance EPC contracts covering the equipment, installation, and maintenance support for the end-user.

- The portion of the GEF equity grant allocated to UEEF will be made available to the private ESCOs as either equity or debt. The equity investments would involve minority positions in ESCOs or specific performance-based EE projects, thereby providing some of the early market risk capital necessary to stimulate additional investment. Without a culture of equity investment in EE in Uruguay, it may be difficult for any emergent ESCO to take on particular EE projects. Alternatively, the debt instruments offered by UEEF would enable ESCOs not interested in offering equity in the companies or their projects to secure resources for project implementation. This liquidity is vital in the near-term, since the commercial banks are unable to lend to untested enterprises such as the ESCOs in the context of Uruguay's current economic crisis. The GEF-funded equity and debt financing will provide ESCOs with the co-financing that they will need to make the transition to commercial lending, and in the initial phases of operation UEEF will seek to increase the share of commercial loans in its portfolio as a way to preserve the GEF-funded capital and ensure a high degree of debt recycling. The success of UEEF's activities utilizing these GEF-funded resources will also enable the Fund itself to eventually secure commercial resources from the pension funds as well as commercial banks.

C. Project Description Summary

1. Project components (see Annex 1):

C.1. Project description and components

The proposed EE Program will fully complement the ongoing T&D project and contribute to enable the implementation of the EE measures included in it.

The EE project has three main components:

Market Development (US$5.35 million including GEF grant of US$ 3.35 million). Aimed to support the transformation of the energy market by creating an enabling framework for EE activities. The GEF funds will be used as follows:

(1) US$ 1.725 million GEF grant, administered by MIEM, for technical assistance covering: (a) preparation of policies and regulations for promoting EE and special studies on taxes and financial regulations affecting EE; (b) training and education programs, including a best practice program , and technical and commercial assessments; (c) enhancement of laboratories to support implementation of a testing, labeling and standards program; definition of standards with participation of manufacturers, importers, user associations, and other representatives of civil society; design and launching of a labeling system, including an EE seal for main household appliances, lighting equipment, building thermal envelope, and industrial equipment; (d) development of standard contractual instruments (performance contracts and independent verification protocols) and financial mechanisms to support ESCO-based projects; (e) market

monitoring and evaluation, including assessments of emissions; and

(2) US$ 1.0 million GEF contingent grant mechanism, administered by UEEF (MIEM), for pipeline and project development by emerging ESCOs. The contingent grant mechanism will be used to help emerging ESCOs to identify candidate projects for investment and cover initial project development cost (feasibility studies). Grants will be made on a cost-sharing basis and will be capitalized in the project financing. Only if projects do not move to implementation will the contingent grant become unrecoverable and be considered an incremental cost to the project activity. Funds that are recovered will be recycled and used in future projects.

Investment Implementation (US$73.750 million including IBRD Loan of US$14.100 million and GEF equity grant of US$3.425 million). Aimed to support: (a) implementation of an USCO-based program (US$19.200 million including GEF financing of US$1.700 million), to (i) execute DSM activities (US$17.200 million, including GEF financing of US$1.425 million), including an equipment retailing program, to facilitate acquisition of efficient appliances and equipment, and (ii) provide efficient modern energy supply to low-income rural customers, facilitating their access to solar home systems (SHS) (US$2.0 million including GEF financing of US$0.275 million); and (b) implementation of EE projects by the emergent ESCOs, business and industry with financing from UEEF and other sources (US$54.550 million including GEF equity grant of US$1.725 million, allocated to the UEEF).

Project management. (US$1.9 million including GEF grant of US$0.1 million). Aimed to support the project steering committee formed by representatives of DNE, UTE and DINAMA, and the Project Management Units in DNE and UTE.

Table 5. Bank and GEF Participation

(Millions of US$ dollars)

Component	Indicative Costs (US$M)	% of Total	Bank financing (US$M)	% of Bank financing	GEF financing (US$M)	% of GEF financing
Market development	5.35	6.6	0.00	0.0	3.35	48.7
Investment implementation	73.75	91.0	14.10	97.2	3.43	49.9
Project management	1.90	2.3	0.40	2.8	0.10	1.5
Total Project Costs	81.00	100.0	14.50	100.0	6.88	100.0
Total Financing Required	81.00	100.0	14.50	100.0	6.88	100.0

Table 6. Project Cost and Financing Plan

(Millions of U.S. dollars)

Project Component	IBRD Loan to UTE	GEF Grant					DNE	UTE	Private/ Public	
		Technical Assistance Grant	Contingent Grants (UEEF)	Equity Financing		Total				
				USCO	UEEF					
Market development	**0.000**	**1.725**	**1.000**	**0.175**	**0.450**	**3.350**	**0.800**	**0.200**	**1.000**	**5.**
Policy and regulatory support	0.000	0.200	0.000	0.000	0.375	**0.575**	0.148	0.000	0.000	**0.**
Training and education	0.000	0.100	0.000	0.100	0.000	**0.200**	0.200	0.200	0.500	**1.**
Labeling and standards	0.000	1.200	0.000	0.000	0.000	**1.200**	0.252	0.000	0.000	**1.**
Peerformance contract development	0.000	0.025	0.000	0.075	0.075	**0.175**	0.000	0.000	0.500	**0.**
Market monitoring and evaluation	0.000	0.200	0.000	0.000	0.000	**0.200**	0.200	0.000	0.000	**0.**
Contingent grant mechanism	0.000	0.000	1.000	0.000	0.000	**1.000**	0.000	0.000	0.000	**1.**
Investment implementation	**14.100**	**0.000**	**0.000**	**1.700**	**1.725**	**3.425**	**0.000**	**3.000**	**53.225**	**73**
USCO (DSM and SHS activities)	14.100	0.000	0.000	1.700	0.000	**1.700**	0.000	3.000	0.400	**19**
DSM activities	12.895	0.000	0.000	1.425	0.000	**1.425**	0.000	2.880	0.000	**17**
SHS activities	1.205	0.000	0.000	0.275	0.000	**0.275**	0.000	0.120	0.400	**2.**
ESCOs	0.000	0.000	0.000	0.000	1.725	**1.725**	0.000	0.000	52.825	**54**
Project management	**0.400**	**0.100**	**0.000**	**0.000**	**0.000**	**0.100**	**0.900**	**0.500**	**0.000**	**1.**
Total	**14.500**	**1.825**	**1.000**	**1.875**	**2.175**	**6.875**	**1.700**	**3.700**	**54.225**	**81**

2. Key policy and institutional reforms to be sought:

During project preparation, the Bank is helping to incorporate the EE concept in the overall energy strategy of Uruguay. Before completion of project preparation, the GOU will submit to the Bank a policy letter laying out this strategy.

During implementation, the project will support development and implementation of policies, regulations, including the newly implemented regulatory framework for the electric sector, and market-based programs aimed to increase the use of EE products and ESCO-based services in the energy market. The training, educational, and marketing activities of the project seek to disseminate knowledge on the efficient use of energy and create a culture of thrift with respect to

energy. Initial projects, and dissemination of best practices, will stimulate greater reliance on non-utility agents to provide EE products and services. Institutional building and regular participation of civil society will seek to give credibility, sustainability, direction, and public support to the project. The project's support for private ESCOs will help underscore the linkage between energy efficiency and improved economic performance as well as economic development. Finally, the project's capacity building components will also demonstrate how refinements to the new regulatory framework, such as implementation of a system benefit charge or other levy on utility bills could be made to channel additional resources to energy efficiency activities, thereby enhancing the sustainability of various project components.

3. Benefits and target population:

C.3. Benefits and target population

The main economic benefits of the EE program will derive from consumer's acceptance of the information disseminated by the project on best practices, guidelines, labels, products, services, etc. Energy savings are projected to accrue from: (a) energy conservation investments by industrial, commercial, and residential users based on initial and replication projects; (b) the adoption of more efficient appliances and equipment resulting from testing, certification, and labeling activities; and (c) the use of renewable technologies to supply dispersed poor rural populations.

Emissions reductions on the order of 250,000 tons of CO2 annually are achievable once the phase-in of the ESCO, USCO and labeling program activities are complete. With reasonable allowances for the penetration of the market by each of these programs, the activities contemplated in the program are expected to generate some 1.22 million tons of reductions over a ten-year period, with 350,000 tons in reductions anticipated in the four-year implementation period alone. Electricity savings are expected to be about 4.6 percent of current sales, while consumption of primary energy in the industrial sector would be cut by about 10 percent, delivering overall efficiency and competitiveness gains for the economy. Other environmental benefits associated with energy conservation are also expected, such as reduction of diseases caused by air pollution in urban areas, as well as negative impacts of acid deposition on agriculture and ecosystems. Inhabitants of rural areas will gain access to more modern energy resources, reducing their exposure to indoor air pollution. In addition, the project will enable UTE to defer investments in power generation and distribution facilities.

4. Institutional and implementation arrangements:

4.1. Policy and Guidance

A Project Steering Committee formed by DNE, UTE and DINAMA will provide the policy framework, overall guidance and general coordination for project implementation. URSEA, the regulator of the power sector, will ensure that the concessionaire contributes to energy efficiency objectives by setting proper electric tariff structures, and through other measures. The Technical Standards Institute of Uruguay (UNIT), will set EE standards and assist DNE in the implementation of a testing and labeling system for the main classes of appliances, equipment, and building envelope materials.

4.2. Project Implementation

UTE will be the executing agency of the project and will be the recipient of the GEF grant on behalf of the GOU. DNE and UTE will sign a subsidiary agreement, outlining fiduciary and financial management responsibilities of DNE to implement its part of the project.

A PIU under UTE, already set up to execute the ongoing Transmission and Distribution project, will coordinate overall project implementation and reporting. A PIU under DNE will implement the Market Development component and the ESCO-based activities. UTE will oversee implementation of USCO activities.

DNE will implement the M&E component of the project (see below) ; it will be responsible for collecting and aggregating performance of energy efficiency projects (including energy savings and global benefits) implemented by GEF beneficiaries (USCO and other ESCOs), for monitoring market development and transformation, and for reporting and disseminating performance results and experience learned.

Annual progress evaluations will be conducted. A mid-term review will be carried out to help to redirect project activities as necessary. Key stakeholders, regulators, EE experts, and NGOs will be invited to periodic workshops to discuss project progress and provide feedback on key activities.

4.3. Creation of USCO

UTE will create an internal unit to provide initial EE services. This unit will be established before project approval and will become the core structure of the USCO. The legal structure of the USCO will be defined during preparation and the timetable for its incorporation will be agreed upon during project negotiations. There is a precedent for this type of initiative at UTE, in the form of the division that conducts consulting activities for national and international clients, primarily from but not limited to the public sector.

4.4. Creation of the UEEF and promotion of the ESCOs

UEEF will be created as a special initiative of MIEM, with technical support from DINACYT. The UEEF will have an Advisory Board chaired by MIEM/DNE and including representatives of MIEM/DNI, DINAMA, OPP, DINACYT, CONICYT, and UTE. The staff of UEEF will include, at minimum, two individuals, one with extensive experience in fund administration and

the other an engineer with training and experience in energy efficiency and cogeneration. MIEM and the Advisory Board may determine that the long-term sustainability of the Fund will be enhanced if it is transferred to a commercial or public sector financial institution, such as the BROU to strengthen and deepen UEEF's capabilities on the finance side, and linkages to the commercial financial sector.

4.5. Monitoring and Evaluation

Monitoring and evaluation (M&E) will build on methodologies developed for similar World Bank/GEF activities, with particular attention to deriving guidelines for non-grant GEF mechanisms. Technical assistance has been identified and a budget of US$400,000 is allocated in the proposed cost structure to: (i) confirm baseline during the first year of project implementation; (ii) monitor market transformation and achievements of development and global objectives against benchmarks—to be developed during project preparation and agreed upon before GEF CEO Endorsement; (iii) assess implementation progress during a mid-term review and take corrective actions (if any) to stimulate the market; (v) assess achievements of project objectives at project completion; and (vi) demonstrate to stakeholders the global and local environmental benefits of energy efficiency activity through dissemination of project/program results. Measurement and verification will be developed at both the project and program levels. Specifically, each individual ESCO project will include an M&E component as the savings must be verified as part of the performance contract and confirmed in order for savings payments to be made. Market transformation indicators specific to the labeling program and the solar home systems will be developed to monitor and assess program sustainability.

4.6 Next steps in project preparation

GEF approved a PDF-B Grant (US$340,000) to cover the costs of preparatory work required prior to GEF CEO Endorsement. The work completed to date using grant resources includes: (i) conducting market survey and research, updating quantitative information on baseline conditions, and strengthening the cost-effectiveness and incremental analysis (including estimations of replication potential); (ii) completing studies to confirm initial project pipeline and prepare three EPC-based projects for implementation; (iii) developing a business plan for USCO (including market analysis, financial projections, capitalization, legal structure, organization and staffing, and job descriptions) to be used for its incorporation; and (iv) selecting the financial intermediary to channel the GEF equity grant to eligible beneficiaries, and setting up financial mechanisms and fund management terms needed to support independent ESCOS.

The remaining activities to be completed include: (i) conducting workshops to build consensus among all relevant stakeholders, including NGOs; and (ii) developing a monitoring and evaluation (M&E) plan, including target values of indicators for development and global objectives and for implementation progress, and M&E requirements at project and program levels.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

The first alternative considered was the business as usual option, that is, meeting the growing demand for energy by expanding the energy supply system. However, this approach would not have been consistent with the national strategy to reduce energy supply risks by minimizing the dependence on imports. Also, this option would not have helped the GOU in its efforts to comply with its commitments under the UN Framework Convention on Climate Change.

The alternative of direct investment in large EE projects was discarded in favor of a market-based approach (implementing initial projects that would allow learning by doing and disseminating the results in the market), complemented by programs to enable users to make informed decisions when purchasing energy-consuming appliances and equipment, and to replicate best practice experiences. This approach is justified because Uruguay has some experience with performance contracting and EE services, but this experience is not well understood among policy-makers, the public and much of the business and industry communities.

Within this alternative, a strategy of relying only on the emergent ESCOs to build up capacity for the provision of EE services was considered, but this seemed risky due to the relative weakness of the ESCOs now operating in Uruguay. Instead, a dual-track approach is favored in order to capitalize on the experience of UTE and cultivate incipient EE activities in Uruguay without stifling the emergent ESCOs. The dissemination of the experiences of USCO and the private ESCOs, together with the capacity building activities and the financial support for USCO and the ESCOs included in the project, will reinforce the conditions for their development.

While it is possible that competition between USCO and the private ESCOs could occur more quickly than anticipated, possibly leading to crowding out by USCO, there is evidence both from UTE as well as from the industrial sector that suggests that it will take some time before the market segmentation begins to erode. For UTE, the activities of USCO will test whether the utility can diversify its service offering and enhance its position in the energy market now that natural gas is available to an increasing segment of the population. The ESCOs, meanwhile, will attempt to build up their balance sheets by implementing quick-payback projects beginning with existing clients and others within their established networks.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed			
Energy Efficiency	Brazil – Energy Efficiency Project (*)	U	S
Energy Efficiency	Ecuador – PERPTAL – Public Enterprise Reform and Privatization (*)	S	S
Energy Efficiency	Jamaica – Demand Side Management Project (*)		
Energy Efficiency	Mexico – High Efficiency Lighting Project (*)	S	S
Energy Efficiency	China – Energy Conservation Project (*)	S	S
Energy Efficiency	Thailand – Electricity Efficiency Project		
	Poland – Krakow Energy Efficiency Project (IBRD)	S	S
	Croatia – Energy Efficiency Project (IRBD/GEF) (Under Preparation)		
Sustainable Electrification of Rural Areas with Private participation	Argentina – PERMER (*)	U	S
Other development agencies			
UNDP	Uruguay -Climate Change Enabling Activity		
IADB	Uruguay - Program to Strengthen the Environmental Management Capacity Directorate (DINAMA). Completed		
IADB	Uruguay - Environmental Management Support (Planned)		
ADB	Uruguay -Technology laboratory of Uruguay (LATU)		
IADB	Uruguay - Sustainable Markets for Energy Efficiency and Clean Energy Sources		
IADB	México – Energy Efficiency		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

*Supported by GEF.

3. Lessons learned and reflected in proposed project design:

Lessons learned from EE projects in North America, Europe and client countries (China, Croatia, India, and Poland) in addressing market barriers were taken into consideration. The project incorporates improvement in pricing and regulation, delivery of EE services through utility-based ESCO and independent ESCOs, market transformation incentives through labeling program, consultative process of key stakeholders, institutional capacity building, and GEF grant and non-grant mechanisms.

Independent ESCOs have demonstrated that they can capture energy savings and reduce cost to users in several countries, while the utility-based model has been found suitable where experience is missing or the risks perceived by the private sector are too high, as in Uruguay. At the same time, efforts to create financial mechanisms that support private ESCOs have met with success in markets where there are energy efficiency entrepreneurs. The experience of Uruguay with performance contracting in an area related to energy efficiency, as well as the presence of nascent ESCOs in the country at present, creates fertile ground for the emergence of an active ESCO sector provided that financing is made available.

Standards, testing, and labeling programs have demonstrated in numerous countries that they can contribute positively to transform the EE market in a sustainable way. Research and implementation of EE projects in developing countries have proven that, while market conditions and cultural parameters may vary among countries, the standard-setting and labeling process could successfully be implemented across most of them. The implementation of a six-step process in pilot programs, has proposed by Uruguay, has resulted in the establishment of new standards and introduction of energy efficiency labels in Thailand, China, Mexico, Colombia, Ghana, the Republic of Korea and the Philippines, among others. Also, there is extensive expertise on EE labeling programs and testing facilities in the MERCOSUR region that will be capitalized by entering in mutual recognition agreements with laboratories outside of Uruguay (particularly those in Brazil and Argentina) that would leverage GEF funding. Uruguay is also participating in regional initiatives focusing on EE labels, as the MERCOSUR Standards Organization (AMN) and the Pan-American Standards Commission (COPANT) at hemispheric level, which experience has been incorporated in the project design, e.g., the preliminary selection of a label design to be adopted by all countries in the MERCOSUR area. A successful labeling program in Uruguay could also lead to its dissemination in other South American countries.

Lessons learned in rural electrification initiatives aimed to provide modern energy through SHS in several countries, such as Bangladesh, Dominican Republic, India, Sri Lanka and Vietnam, show that leading projects incorporate a combination of basic features that include private sector and NGO involvement, credit mechanisms, first-cost subsidies, support for policy development and capacity building, codes and standards, and marketing programs. These lessons, combined with those learned in Uruguay through the installation and operation of SHS in community facilities in rural areas have been applied to the design of the project. Its main features include the use of an USCO-based mechanism with the participation of rural service providers, first-cost subsidies during the initial phase of the program, a long term leasing system to facilitate ownership, and capacity building and policy development support. Such arrangements are

expected to reduce implementation risks, due to UTE's experience in rural electrification, its presence in rural areas, and the flexibility that will be provided by USCO and private participants. Participation of rural NGOs and rural institutions in project operation and billing collection will contribute to reduce costs and enhance community participation.

4. Indications of borrower and recipient commitment and ownership:

Uruguay ratified the United Nations Framework Convention on Climate Change on August 18th, 1994 and the Kyoto Protocol on February 5th, 2001. The country submitted the first communication and is in the process of completing the second communication. The first communication recognized the need to promote energy efficiency measures to reduce GHG emissions.

The activities included in the EE project are also part of the Government's energy sector strategy. The latter includes setting energy prices at economic levels to maintain the commercial viability of the sector and to give price signals that provide incentives for energy efficiency The President of Uruguay approved the preparation of the EE project with GEF support through a PDF Block B grant.

5. Value added of Bank and Global support in this project:

The experiences of the Bank and GEF in financing EE programs in Latin America and around the world are helpful for supporting the design and implementation of programs based on market-based approaches in which Uruguay has no experience. The Bank's broad perspective encourages a comprehensive project design, including policy and regulatory aspects, private sector participation and proper consultation to civil society. Bank expertise in monitoring and evaluation are helping to incorporate these features in the project design.

The Bank and GEF's knowledge of regional EE institutions and practitioners could facilitate the exchange of experiences, the creation of regional standards and practices, and the integration of a network of regional laboratories that could help to maximize the use of existing regional infrastructure. This approach could support the expansion of a more competitive market for EE equipment in the MERCOSUR area and beyond.

Given that ESCOs are still a relative novelty in Uruguay and that the Uruguayan commercial banks are generally lukewarm about providing long-term financing for new business, for energy efficiency as well as many other initiatives, and especially in light of the current difficulties of the financial sector, it is likely that the project will -- even with strong efforts from its inception -- encounter difficulties in getting commercial bank financing. The World Bank loan and GEF funds will therefore be critical to provide financing during the start-up years of the ESCO program. As the ESCOs establish the credibility of the energy performance contracting principle and the underpinning risk sharing arrangement through successful energy efficiency projects (with clients complying with the repayment terms), the UEEF will be able to expand its activities and slowly help induce activities of commercial banks in this sector. Similarly, given the difficulties of starting an ESCO business in a new market -- and the low profitability of this kind of business in its early years,-- it is unlikely that private investors will venture to invest equity up-front in such activities. While the World Bank/GEF fund will be essential in providing part of

the initial financing for the project (through USCO and other emerging ESCOs), the general support of the World Bank/GEF to the project will help build-up the credibility of the ESCO business. Gradually, this would help attract commercial bank financing and private investment.

Finally, Bank and GEF experience will help overcome financial barriers and improve sustainability by offering a variety of financial instruments, such as loans, grants, contingent grants, and equity financing in project design.

E. Issues Requiring Special Attention

1. Economic

☐ Summarize issues below ☒ To be defined ☐ None

Economic evaluation methodology:

● Cost benefit

○ Cost effectiveness

○ Incremental Cost

○ Other (specify)

A cost-benefit analysis for the creation of USCO within UTE indicates that the profits of USCO will offset the lost sales resulting from the implementation of USCO's projects. The net present value of USCO's projected profits (EBITDA) during the first five years of operation is projected at $1.38 million (based on a 10-percent discount rate), while the value of lost sales to UTE is estimated at $1.05 million during the same period (based on UTE projections and a 10-percent discount rate). However, the potential savings achievable over and above those achieved by USCO through the labeling program in the residential, commercial and governmental sectors, estimated at about 100 GWh, would yield additional revenue losses to UTE, balanced by economic gains in the retail and manufacturing sectors linked to the production, importation and sales of energy-efficient goods and services. A comprehensive cost-benefit analysis will be updated as part of project preparation, as well as estimates of economic rates of return and payback periods for the initial investment activities and the overall project.

2. Financial

☒ Summarize issues below ☐ To be defined ☐ None

UTE's present financial situation is sound. Financial projections, which will be updated during project preparation, show no problems in the medium term. The size of the proposed project is reasonable compared with current level of annual investments and revenues, and therefore, does not pose additional risks to UTE's finances. USCO operations will also be forecasted during project preparation to evaluate expected financial performance and the correct mix of loan and equity financing for the initial projects. The impact of activities over and above those of USCO, however, could produce additional lost sales not offset by corresponding profits from EE activities.

The fiscal impact of investments in EE measures will be positive as a result of taxes and duties paid by project participants. Implementation of EE measures in public facilities should reduce expenditures at both national and municipal levels.

In order for the AFAPs to purchase UEEF debt, as contemplated, the Fund will have to have

received the appropriate rating from one of the rating agencies active in Uruguay. This in turn will require that the management of UEEF be capable of gaining the confidence of the rating agencies, and its performance in the early phase of activity will likewise have to inspire confidence. The credibility of UEEF management will in turn depend on the quality of the selections made by the Advisory Board of the UEEF.

3. Technical

☒ Summarize issues below ☐ To be defined ☐ None

All project components will use proven technologies and practices for which goods and services are available in international markets.

4. Institutional

4.1 Executing agencies:

UTE, which has a proven capacity to administer projects, will be the executing agency. UTE will continue to use its information system, which provides adequate monitoring of activities and meets the Bank's reporting requirements. The project includes institutional building and operational support to enable DNE to strengthen its managerial capacity and fulfill its role as EE policy maker, as well as overseer of the activities of the UEEF.

4.2 Project management:

Project management will require close coordination between DNE and UTE. Project design includes support to DNE to strength its managerial capacity.

4.3 Procurement issues:

For procurement and financial management, UTE will provide technical support to DNE, if required. In order to accelerate implementation of the component aiming to provide modern energy services based on solar panels to low-income dispersed rural populations, UTE is planning to acquire about 1,000 solar home systems (SHS) following the Bank's procurement rules. Offers were already received, but purchase of the equipment is subject to obtaining the GEF grant, which would be partially used to facilitate access to the first customers and market penetration of the program. To this end, UTE has asked that this equipment be considered for retroactive financing by GEF.

4.4 Financial management issues:

Accounting reporting will follow standard procedures and accounting practices. UTE will provide, within six months of the end of each fiscal year an audit report, prepared by external auditors satisfactory to the Bank, on special accounts, project accounts, and statement of Expenses (SOE).

5. Environmental

5.1 Summarize significant environmental issues and objectives and identify key stakeholders. If the issues are still to be determined, describe current or planned efforts to do so.

No adverse environmental effects are expected to result from the project. There would only be modest interventions in the case of upgrading/retrofitting of energy equipment, which must comply with local environmental regulations. Positive impacts will include savings in power generation and fuel use, which would help reduce the risks of global warming by reducing CO2 production. This will happen even in the mostly hydroelectric Uruguayan generation system because, at the margin, the economic dispatching will reduce the production of electricity by thermal units that use hydrocarbons.

5.2 Environmental category and justification/rationale for category rating: **C - Not Required**

5.3 For Category A and B projects, timeline and status of EA

EA start-up date:
Date of first EA draft:
Expected date of final draft:

5.4 Determine whether an environmental management plan (EMP) will be required and its overall scope, relationship to the legal documents, and implementation responsibilities. For Category B projects for IDA funding, determine whether a separate EA report is required. What institutional arrangements are proposed for developing and handling the EMP?

5.5 How will stakeholders be consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed EMP?

5.6 Are mechanisms being considered to monitor and measure the impact of the project on the environment? Will the indicators reflect the objectives and results of the EMP section of the EA?

6. Social

6.1 Summarize key social issues arising out of project objectives, and the project's planned social development outcomes. If the issues are still to be determined, describe current or planned efforts to do so.

The proposed project poses no resettlement, land acquisition or social development issues. The project is expected to improve affordability of energy services and, therefore, have a positive net social impact on energy consumers in general and on rural poor populations in particular.

6.2 Participatory Approach: How will key stakeholders participate in the project?

The collaborative nature of the project makes a participatory approach among the participants inherent in the planning and execution of its activities. A two-way consultation (information sharing and feedback solicitation) was initiated during project preparation, in order to inform the public, engage key stakeholders and incorporate feedbacks into the program design. A DSM workshop with international participation was conducted in Uruguay for policymakers, regulators, and authorities and managers of UTE. During project preparation, the same stakeholders will be invited by DNE to participate in workshops, and technical visits to consolidate participation and ownership. A local NGO active in energy issues was consulted during project preparation and continues working actively with DINAMA. Consultants with

knowledge of regional EE initiatives were involved in preliminary project evaluation and will continue participating in completion of project preparation. Further public participatory activities are envisaged during project preparation and implementation, and will be financed from, respectively, the PDF-B grant and the project funds. It is expected that the involvement of the stakeholders will continue during this stage, in particular during the development of the initial projects targeted by USCO for municipal clients. Such collaboration with direct beneficiaries will increase when they are informed about the performance of implemented energy efficiency projects and have a chance to propose their own projects for financing by the project. Market surveys, including consultation with civil society, will be conducted to help measure project performance. In low-income areas, social workers will participate in project implementation and evaluation of results.

6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

Before starting project preparation, representatives of key stakeholders, including representatives of the industry and a NGO active in the EE arena, were consulted to ensure public participation. The information dissemination and consultation features of the project will facilitate public participation during implementation, as well as extend ownership and improve prospects for sustainability.

6.4 What institutional arrangements are planned to ensure the project achieves its social development outcomes?

The project incorporates participation of social workers in the design and implementation of pilots affecting low-income population in rural areas. Workshops and seminars will include participation of representatives of civil society to verify project direction and social effects.

6.5 What mechanisms are proposed to monitor and measure project performance in terms of social development outcomes? If unknown at this stage, please indicate TBD.

Market surveys, including consultation with civil society, will be conducted to help measure project performance. In low-income areas, social workers will participate in project implementation and evaluation of results.

7. Safeguard Policies

7.1 Do any of the following safeguard policies apply to the project?

Policy	Applicability
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	○ Yes ● No ○ TBD
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	○ Yes ● No ○ TBD
Forestry (OP 4.36, GP 4.36)	○ Yes ● No ○ TBD
Pest Management (OP 4.09)	○ Yes ● No ○ TBD
Cultural Property (OPN 11.03)	○ Yes ● No ○ TBD
Indigenous Peoples (OD 4.20)	○ Yes ● No ○ TBD
Involuntary Resettlement (OP/BP 4.12)	○ Yes ● No ○ TBD
Safety of Dams (OP 4.37, BP 4.37)	○ Yes ● No ○ TBD
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	○ Yes ● No ○ TBD
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	○ Yes ● No ○ TBD

7.2 Project Compliance

(a) Describe provisions made by the project to ensure compliance with safeguard policies which are applicable.

NA

(b) If application is still to be determined, describe current or planned efforts to make a determination.

8. Business Policies

8.1 Check applicable items:

☐ _ Financing of recurrent costs **(OMS 10.02)**
☐ _ Cost sharing above country 3-yr average **(OP 6.30, BP 6.30, GP 6.30)**
☐ _ Retroactive financing above normal limit **(OP 12.10, BP 12.10, GP 12.10)**
☐ _ Financial management **(OP 10.02, BP 10.02)**
☐ _ Involvement of NGOs **(GP 14.70)**

8.2 For business policies checked above, describe issue(s) involved.

NA

F. Sustainability and Risks

1. Sustainability:

The project will contribute to the creation of a sustainable EE market in Uruguay by: (i) supporting the development and implementation of the enabling policy and legislation, including labeling standards; (ii) providing knowledge and building capacity among decision-makers and market participants for a better understanding and acceptance of EE investments and financing; and (iii) supporting the creation of an attractive climate for private investments in commercially viable and replicable EE projects, as well as the financing mechanisms and structure that will address market risks and entice multiple market participants to seek business opportunities in energy efficiency. The use of contingent grant, commercial loans and equity financing mechanisms by USCO and UEEF, with GEF-funded as well as commercially sourced resources, would help expand the pipeline of projects implemented with ESCO and USCO participation beyond the implementation period, thereby enhancing sustainability.

An exit strategy for the GEF at project completion will be defined during project implementation. Appropriate arrangement will be agreed upon for the use of the remaining GEF funds under the contingent grant and equity financing modalities, consistent with the project objectives.

1a. Replicability:

Energy Efficiency programs in developing countries have proven that, while market conditions and cultural parameters may vary among countries, the standard-setting and labeling process is similar across most countries. The implementation of a six-step process in pilot programs has resulted in the establishment of new standards and introduction of energy efficiency labels in Thailand, China, Mexico, Colombia, Ghana, the Republic of Korea and the Philippines, among others. A successful labeling program in Uruguay could also lead to its dissemination in other South American countries. The ESCO program shares similar international characteristics and

replication potential.

Implementation of the initial phases of the SHS program by UTE's USCO, will contribute to accumulate experience to complete the electrification of Uruguay, a mandate that UTE is committed to carry on. A successful implementation of the two initial phases with GEF support (Phase 1 with both tariff and technical assistance support; Phase 2 with only technical assistance support) will ensure the continued use of SHS as an efficient technology for off-grid rural electrification, to replace traditional grid extension when this is not economically viable.

If the first two phases are successful, isolated communities and households will put pressure on USCO to be part of the program and receive the benefits of modern energy through future replications to be financed by UTE-USCO and the rural service providers associated with the project.

2. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Risk	Risk Rating	Risk Mitigation Measure
From Outputs to Objective		
Lack of continuity of energy sector reform and modernization of regulatory framework	M	· Bank technical and financial support to MIEM and URSEA under a separate project · Provide training, education and disseminate information energy sector reform and EE regulations
Energy savings achieved do not last	M	Creation of stable market-based mechanisms to save energy (USCO, ESCO, and standards and labeling program)
Expected savings do not materialize	S	· Detailed review of savings estimations by experienced consultants · Share risks among participants
NGOs are not supportive	M	· Involvement of key NGOs in workshops, seminars and technical visits and educational programs. · Involvement of NGOs in project design and implementation.
From Components to Outputs		
Potential participants and partners are not committed	S	· Provide training, education and disseminate information on best practices, technical guidelines, and cases of success · Arrange technical visits and workshops to discuss local and foreign experiences
End-users do not accept to participate in the project	M	· Provide financial incentives to key stakeholders to implement initial projects · Provide training, education and disseminate information on succesful projects of ESCOs and USCO.
Inappropriate or inadequate counterpart/ third party/ commercial funding	S	· Engage counterparts early in the project to demonstrate benefits · Introduce performance contract and

		independent verification instruments in the marketplace · Build capacity in local banks · Work with the Office of Budget and Planning
Financial rate of return of projects is lower than expected	S	· Provision of competitive financing through USCO and GEF-funded loans and equity will help reduce cost of capital.
Public sector entities do not use life cycle concept to buy equipment	M	· Design of draft regulations and work with the Office of Planning and Budget
Public sector entities are not allowed to use savings to pay performance contracts with ESCOs	M	· Design of draft regulations and work with the Office of Planning and Budget
Institutional arrangements are not satisfactory and managerial and technical capacity of participants is inadequate	S	·Creation of adequately staffed PIUs ·Implementation of capacity building components, including core support to DNE, UTE, and URSEA
Overall Risk Rating	S	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N(Negligible or Low Risk)

3. Possible Controversial Aspects:

No controversial aspects are foreseen.

G. Project Preparation and Processing

1. Has a project preparation plan been agreed with the borrower (see Annex 2 to this form)?

☒ Yes - date submitted: ☐ No - date expected:

A Project Implementation Plan (PIP) is under preparation and will be completed with GEF support by July 2003.

Note: Annex 2 referred in this section and below in Sections 3 and 4 is a standard Annex of the Bank PCD, however it is not part of this Project Briefing.

2. Advice/consultation outside country department:

☒ Within the Bank: EASEG team for China - Energy Conservation Project.
☒ Other development agencies: GEF Coordination Team (ENVCG)
☒ External Review Energy Efficiency Thematic Group

3. Composition of Task Team (see Annex 2):

Nelson de Franco	LCSFE Lead Power Engineer, Task Manager
Rachid Benmessaoud	ECSIE Lead Energy Specialist
Vladimir Jadrijevic	LCOPR Senior Procurement Specialist
Luis M. Vaca-Soto	Consultant, Energy Specialist
Hernán. Campero	Consultant, Economist
Susana Cirigliano	Financial Management Specialist
Mariangeles Sabella	Lawyer
Xiomara Morel	Disbursement Officer

4. Quality Assurance Arrangements (see Annex 2):

The project team is experienced in energy sector reform and regulations, utility management and energy efficiency. External consultants with international experience in ESCO development and operation, performance contracting, labeling programs, energy auditing, contract performance and verification, have been involved and will continue participating in project preparation with the support of a GEF- PDF Block-B grant.

The composition of the quality assurance team is:

Susan Goldmark	LCSFE, Sector Manager, Project Management
Charles Feinstein	LCSFE, Lead Energy Specialist, Peer Reviewer
Amarquaye Armar	EWDEN, Lead Energy Specialist, Peer Reviewer
Robert P. Taylor	EASEG, Lead Energy Specialist, Technical Feasibility
Elena Correa	LCSES, Senior Social Specialist, Beneficiary Participation - Social/Gender Issues
Juan Quintero	LCSES, Lead Environmental Specialist, Environmental Safeguards

[signature]
Task Team Leader/Task Manager: Nelson de Franco

[signature]
Sector Manager/Director: Danny Leipziger

[signature]
Country Manager/Director: Axel van Trotsenburg

5. Management Decisions:

Issue	Action/Decision	Responsibility

Total Preparation Budget: (US$000) **Bank Budget:** **Trust Fund:**
Cost to Date: (US$000)
☐ **GO** ☐ **NO GO** **Further Review** [Expected Date]

Nelson De Franco	Danny Leipziger	Axel van Trotsenburg
Team Leader	**Sector Manager**	**Country Manager**

Annex 1: Project Design Summary

URUGUAY: UY- Energy Efficiency

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
Sector-related CAS Goal: ● Support the efficient and sustainable development of the energy market to help balance Uruguay's economic development goals with its environmental agenda	**Sector Indicators:** ● Public acceptance and adoption of measures aimed to produce and use energy efficiently	**Sector/ country reports:** ● Market surveys	**(from Goal to Bank Mission)** ● Social and political support to EE and reduction of GHG emissions
GEF Operational Program: ● Removal of Barriers to Energy Efficiency and Energy Conservation (Program No. 5) **Project Development Objective** ● Increase consumer-driven demand for, and competitive supply of, energy efficient goods and services	**Outcome / Impact Indicators:** ● Reduction in greenhouse gas (GHG) emissions **Outcome / Impact Indicators** ● Market share of energy efficient equipment and appliances ● Emergence of local ESCOs	● National Communication to the UNFCCC **Project reports** ● Implementation and completion reports ● Market surveys	● Electric power and other energy products and services priced at economic costs **(from Objective to Goal)** ● Adequate macroeconomic conditions
Global Objective: ● Overcome barriers of (a) lack of capacity and know-how among stakeholders; and (b) lack of EE financing and investments	**Outcome / Impact Indicators:** ● Number of trained stakeholders ● Market acceptance of ESCO's offering ● Amount of co-financing from private stakeholders ● Carbon savings achieved	**Project reports:** ● Implementation and completion reports ● Market surveys	**(from Objective to Goal)** ● Adequate regulatory environment for EE and reduction of emissions
Output from each Component: ● Create the enabling framework for the EE	**Output Indicators:** ● EE policy adopted and related legislation	**Project reports:** ● Implementation and completion reports	**(from Outputs to Objective)** ● Continuity of energy sector reform and

market • Stimulate the development of the EE market by facilitating the availability and acquisition of EE equipment and services, making them also more accessible to the poor	(including labeling) enacted • Market transformation indicators (actual versus baseline) • Number of projects reaching financial closure • Sales volume of energy efficient equipment and appliances • Number of ESCO projects generated, including sales volume and co financing mix • Number of low income beneficiaries • Energy savings achieved	• Market surveys • Implementation and completion reports • Market Surveys	modernization of regulatory framework • Materialization of savings • Support of NGOs
Project Components / Sub-components:	**Inputs: (budget for each component)**	**Project reports:**	**(from Components to Outputs)**
Market Development • Regulatory framework • Training, education, public information and dissemination, and best practices • Standards, testing and labeling • ESCO development • Market monitoring and evaluation • Pipeline and project development	• US$ 5.35 million, including US$ 3.35 million from GEF (Technical Assistance Grant: US$ 1.725 million; Contingent Grant: US$ 1.0 million)	• Implementation and completion reports • Project Management Reports • Supervision reports Audit reports	• Commitment of other participants and partners • Customer acceptance
Investment Implementation • EE equipment retailing • EE services • Low income energy access	• US$ 73.75 million, including US$ 3.425 million from GEF (Equity Financing)		• Appropriate counterpart/ third party/ commercial funding • Lower than expected financial rate of return

			• Public sector entities use life cycle concept to buy equipment • Public sector entities are allowed to use savings to pay performance contracts with ESCOs
Project Management • Support to Project Management Units	• US$ 1.9 million, including US$ 0.1 million from GEF (Technical Assistance Grant)		• Appropriate institutional arrangements and managerial and technical capacity of all participants
Total	US$ 81.0 million, including a US$ 6.875 million Grant from GEF		

Annex 2: Incremental Cost Analysis
URUGUAY: UY- Energy Efficiency

INCREMENTAL COST ANALYSIS

Introduction

Uruguay is moving from a relative economic isolation to a new era of economic competition and regional market integration, including regional energy market integration. This process has advanced to a substantial degree with the development of the major hydroelectric resources that Uruguay shares with Argentina, and, more recently, the establishment of natural gas pipelines to deliver fuel from Argentina. It is also important to note that the energy sector has traditionally been heavily influenced by external factors, given Uruguay's stock of indigenous energy resources, which are limited to hydropower, firewood and other biomass fuels (such as sugarcane bagasse, rice hulls and other agricultural wastes). Based on data from the 2000 energy balance, it is evident that Uruguay imports about 70% of its energy requirements.

Progress in this long-term process may be delayed as a result of the country's current financial and economic crisis. The devaluation of the peso and ensuing banking crisis in mid-2002, which resulted in large part because of Argentina's economic crisis, has triggered a massive reduction in liquidity in Uruguay's banks and will lead to an economic contraction in 2002 and 2003. It has also triggered a temporary reordering of relative prices in the energy sector, since natural gas pricing and transportation tariffs were indexed to the dollar, but UTE's electric tariffs and ANCAP's liquid fuels are set by the government, and hence are less responsive to market forces.

The country's hydroelectric potential has already been largely developed. Indeed, the electric sector is dominated by four hydroelectric stations located on the Río Negro in the central part of the country, and a bi-national facility on the Río Uruguay, the boundary with Argentina. Together, these four facilities represent over 70% of installed generation capacity, and, depending on rainfall patterns, this can cover virtually all the country's peak load (see Table 1, next page). However, the capacity margin of Uruguay's hydroelectric resources is steadily eroding as peak load increases, while opportunities for additional hydroelectric capacity have all but been exploited, so new capacity – and the marginal unit in the system – will be thermal.

Consistent with Uruguay's resource base, in relatively wet years, such as 1995, 1998 and 2001, the amount of thermal generation required by UTE may amount to as little as 5% of total output. In contrast, in relatively dry years, such as 1999, this figure can exceed 20%. Energy imports from Argentina also increase during dry years, and while the Argentine grid is dominated hydroelectric capacity, the marginal units serving Uruguay's energy needs are most likely to be thermal (see Table 2). Moreover, in the future thermal generation will increase as a share of total production, consistent with the development of resources other than hydroelectric facilities. Demand is expected to grow at 3 percent per annum over the next ten years, albeit with a slowdown in 2002 and 2003. Accordingly, government planners estimate that private companies could build up to 850 MW of new gas-fired power generation capacity within a decade. In the event that this new capacity

Table 1: Capacity and peak load data for Uruguay, 1995-2001

(Figures in MW)

	1995	1996	1997	1998	1999	2000	2001
UTE							
Hydroelectric							
Terra	133	138	148	148	148	148	148
Baygorria	108	108	108	108	108	108	108
Constitucion	333	333	333	333	333	333	333
Steam							
Units3 and 4	100	100	100	100	100	100	100
Unit 5	88	88	88	88	88	88	88
Unit 6	125	125	125	125	125	125	125
Gas Turbines							
AA	24	24	24	24	24	24	24
CTR	226	226	226	226	226	226	226
Deisel (off-grid)	26	20	N/A	18	18	18	8
Salto Grande (Uruguay side)	945	945	945	945	945	945	945
Total capacity	**2,108**	**2,107**	**N/A**	**2,115**	**2,115**	**2,115**	**2,105**
Percent hydroelectric	72%	72%		73%	73%	73%	73%
Peak Load	**1,204**	**1,269**	**N/A**	**1,287**	**1,349**	**1,463**	**1,459**
Margin for Total Capacity	43%	40%	N/A	39%	36%	31%	31%
Margin for Hydroelectric Capacity	21%	17%	N/A	16%	12%	5%	5%

Source: UTE.

Table 2: Generation and energy flows in Uruguay, 1995-2001

(Figures in GWH)

	1995	1996	1997	1998	1999	2000	2001
Generation							
Hydroelectric	2,554	1,586	N/A	3,832	2,125	3,000	3,659
Thermal	377	827	N/A	328	1,616	490	9
Diesel (off-grid)	4	4	N/A	6	5	5	6
Purchases							
Salto Grande	3,197	3,901	N/A	4,556	3,273	3,103	4,310
Argentina	188	309	N/A	78	708	1,328	117
Brazil	0	0		0	0	0	6
Total production	**6,320**	**6,627**	**N/A**	**8,800**	**7,727**	**7,926**	**8,107**
Exports							
Argentina	12	17	N/A	25	9	0	73
Brazil	186	140	N/A	1,575	166	88	165
Total Exports	**198**	**157**	**N/A**	**1,600**	**175**	**88**	**238**
Net Energy	**6,122**	**6,470**	**N/A**	**7,200**	**7,552**	**7,838**	**7,869**
Total Sales	4,978	5,187	N/A	5,863	6,184	6,434	6,426
Hydroelectric as share of total	91.0%	82.8%	N/A	95.3%	69.9%	77.0%	98.3%
Thermal as share of total	6.0%	12.5%	N/A	3.8%	21.0%	6.2%	0.2%

Source: UTE.

does not come on line in time, UTE will continue to utilize imported electricity under contracts with generators in Argentina, the majority of which operate thermal facilities. In general, therefore, Uruguay's electric sector baseline will exhibit an increasing share of thermal generation at the margin throughout the entire load curve for the country.

The main thermal electric generation facilities in Uruguay currently utilize heavy petroleum residues (fuel oil), have low thermal efficiencies, and produce emissions in urban zones with negative effects on local air quality and the global environment. Meanwhile, the energy-consuming capital stock is of relatively low energy efficiency, and needs to be replaced during the process of modernization. The availability of natural gas opens up new opportunities to capture potential energy efficiency savings deriving from modification of industrial processes and equipment renovation at the same time that the switch to natural gas is made. To this end, the GOU seeks to remove the barriers to energy efficiency (EE), by facilitating the availability and acquisition of EE services, equipment and goods, and providing affordable access to electricity to all citizens.

Project Concept

The objective of the Uruguay Energy Efficiency Project is to increase consumer-driven demand for, and competitive supply of, energy efficient goods and services. Development of an EE services market will increase domestic supplies through wider application of cogeneration in industry, improve the efficiency of its use of existing resources, thereby making Uruguay's economy less reliant on imported electricity and fossil fuels and reduce overall emissions from the sector.

To meet this objective, the Project will support the Government of Uruguay (GOU) in creating the enabling framework for the development of the EE market, including the creation of mechanisms for financing service providers, projects and programs. This will increase the availability and acquisition of energy efficient goods and services to sectors of the economy that consume large amounts of energy, and residential consumers including the poorest strata of society. In particular, the Project extends the market-driven delivery of energy services to the rural sector where the population, not currently connected to the electricity grid, is willing to pay for switching its electricity supply source from high cost batteries and fossil fuels to a more economic and efficient solar photovoltaic systems, delivering (albeit limited) environmental benefits.

The Project will achieve its objective through: (i) the development of the energy efficiency market including capacity building, monitoring and evaluation, dissemination, standards, testing and labeling; (ii) the establishment of a utility-based energy service company (USCO) to initiate and implement project investment activities, including the provisions of electricity management services to isolated rural households using least-cost solar home systems; and (iii) the establishment of an Uruguay Energy Efficiency Fund (UEEF) to widen project implementation capacity by enabling emerging ESCOs to tap into energy efficiency finance opportunities.

Barriers and Modalities

The Project will address three current barriers to project development: (a) limited capacity and know-how among key stakeholders; (b) lack of consumer-driven demand; and (c) a shortage of project development and investing financing. Lack of know-how, project development and finance has also hampered the Government in implementing its nationwide rural electrification strategy. The Project will address these barriers by creating an enabling framework for a utility-based energy service company (USCO) and multiple market players (including existing and emerging ESCOs) to develop, implement and finance energy savings investments, using the energy performance contracting principle. In addition, the project reaches to isolated rural areas through the provisions by USCO of modern electricity supply and management services, using modern solar home systems (SHS). The Project will address these barriers through an associated IBRD Power Transmission and Distribution Loan (US$14.5 million) and a GEF grant (US$6.875 million). Over ten years (four years of implementation plus six years during which the market transformation will continue and deepen), the Project is expected to attract associated investment co-financing of US$54.225 million from private and public sources and US$5.4 million (UTE and DNE) in local counterpart funding. Total funding for the Project is estimated to be US$81.0 million (excluding GEF PDF-B funding).

The modalities proposed for the use of the GEF Grant funds are: (a) GEF technical assistance grant (US$1.825 million) to finance market development and incremental Project management costs; (b) GEF contingent grant (US$1.0 million) to finance pipeline and project development costs by emerging ESCOs; and (c) a GEF equity financing (US$4.05 million) to finance investments by USCO directly or other ESCOs through UEEF. The GEF equity financing includes US$275,000 earmarked to USCO to enable it (i) reduce the transaction and implementation costs of the first 1000 solar home systems to level not exceeding consumers' current willingness to pay, and (ii) organize and market the implementation of the remaining 1000 solar home systems during the project implementation period. Details of the market survey for SHS, the analysis of consumer's willingness to pay, and the financing plan are in the Technical Annex.

Benefits: Energy Savings, Environmental Benefits, and Capacity Building

In addition to the barrier reduction measures contemplated in the Project, initial projects undertaken in the business plans for USCO and the already existing, but small and undercapitalized ESCOs, will generate energy savings. These savings will yield economic as well as environmental benefits, both in terms of emissions of local pollutants as well as reductions in GHG emissions. The replication of these initial activities will have a large multiplier effect in terms of energy efficiency improvements and emission reductions. The Project will also improve the allocation of resources by helping defer investments in energy supply facilities and by expanding the service and price options available to consumers as a result of the competition among energy suppliers to retain customers in a new market-based energy sector.

Direct benefits from the Project include the economic savings obtained from: (a) initial and follow-on projects implemented by the ESCOs and other project sponsors such as industrial end-users; (b) implementation of low-cost conservation investments by energy users (residential, industrial, commercial, and utilities) as a result of the information dissemination program; (c) EE projects undertaken by UTE; and (d) the dissemination of more efficient appliances, equipment and construction materials as a result of the testing, certification and labeling program.

The SHS component will provide access to cleaner, efficient and affordable electricity supply to the rural populations, reduce harmful pollutants inside the houses, and decrease related adverse health effects. Improved reliability of electricity supply would also enable poor households to access modern means of communications. Besides the local benefits, it would contribute to reduce GHG emission. Details of the economic savings of extending SHS to rural residential users, and the emission reduction benefits resulting from the displacement of more expensive sources of energy (including kerosene, batteries, LP gas and candles) are in the Technical Annex.

The Uruguayan experience, including the SHS component, can provide useful lessons for other countries in the Region facing similar barriers to the provisions of electricity in remote areas. To enhance the replicability of the project and this component in particular after project completion, dissemination of project outcomes, including monitoring and evaluation, and regional workshops involving bilateral and multilateral donors, country officials and private investors are envisaged during implementation. These activities will be financed by the GEF technical assistance funds.

Indirect benefits from the Project include the reductions in contaminant emissions as well as the benefits to the national balance of payments associated with reductions in the consumption of fuels produced from imported petroleum. Based on the analysis of the Baseline Scenario and the Project Scenario developed below, the anticipated reduction in GHG emissions derived from Project implementation over a period of ten years is 1.22 million tons of CO2.

Other benefits associated with the Project include the development of a new sector of the economy that requires the talents of trained engineers and financial specialists. The Project also contemplates training and capacity building activities in the academic sector, which will help support the strengthening of the country's institutions for technical education and keep them abreast of technical advances elsewhere in the world.

Estimated Energy Savings

Potential energy savings have been assessed by an engineering team based on analysis of the national energy balance, visits with Uruguayan industrial facilities indifferent sectors conducted by an experienced energy engineer, assessments of the electric appliance and equipment markets conducted by a leading organization specializing in energy efficiency, surveys to residential electricity consumers to define consumption patterns, visits with ESCOs operating in Uruguay and the leaders of the USCO initiative within UTE, as well as the municipal government of Montevideo.

The estimates prepared by the engineering teams form the basis for a series of inputs in a spreadsheet model that consists of four modules: (i) Industrial savings potential. Estimated by fuel type, using factors generalized from the results of 11 site visits to major industrial and commercial firms in Uruguay. The factors utilized incorporate judgments regarding the economic returns obtainable from process modifications without fuel switching, additional savings made possible by the introduction of natural gas, and equipment upgrades; (ii) Aggregation of industrial, residential, governmental, and commercial savings potential. ESCO sector savings, with inputs from module (i), are combined with sales and savings estimates taken from USCO's business plan, and the estimates prepared by the standards and labeling program team. This represents the *total potential savings* in Uruguay; (iii) Estimate of savings achieved by the Project. These figures are derived from the data in modle (ii), utilizing two sets of market penetration estimates, one for the ESCOs and the second for the Standards and Labeling program. The USCO figures are already based on estimates of market penetration and therefore do not require adjustment. The results of this exercise constitute the *estimated savings from the Project*, which summarized in Table 3, below; (iv) Estimated of emissions reductions based on estimated savings. The model incorporates estimates of carbon emissions reductions from savings in fuel oil and natural gas, as well as electricity. In the case of the fuel and natural gas emissions reductions, generally accepted emissions factors on the basis of energy content are employed, while in the case of electricity, marginal emissions factors developed by UTE itself are included in the model. Estimated net emissions reductions are 1.220 million ton of CO2 in a ten year period.

Table 3: Projected savings from Project implementation

	Years 1-4	Years 1-10	Average Annual	Reference	Average/ Reference	Year 10/ Reference
Hydrocarbon fuels (kTPE)	49	209	21	452*	4.6%	6.35%
Cogeneration (GWH)	501	2,118	212	1,586**	13.4%	18.04%
Electricity (GWH)	194	971	97	7,984#	1.2%	1.92%

*Reference for hydrocarbon fuels is total primary energy consumption. **Reference for cogeneration is industrial energy consumption (total UTE sales to large consumers) in 2002. #Reference for electricity is total UTE output in 2002, less diesel (offgrid) and imports from Argentina.

Analysis of Anticipated Carbon Emissions Reductions from the Project

The Project will generate GHG emissions reductions from changes in several different aspects of energy use in Uruguay. Reductions industry will flow from savings in fuel oil and other petroleum derivatives, fuel switching to natural gas, implementation of cogeneration projects, and reductions in electricity consumption from the grid. In the residential, commercial and governmental sectors, the savings will flow primarily from reduction of electricity consumption, but there may be some savings associated from fuel switching as well. The basis for estimating the reductions achieved under each heading, electricity, petroleum products, and supply-side efficiency gains through cogeneration is described in greater detail, below:

- *Electricity*. As noted, Uruguay's electric sector now utilizes a relatively small amount of thermal generation capacity at the margin. The total amount of thermal generation varies significantly, however, depending on the degree to which rainfall makes intensive use of hydroelectric capacity possible or not. In the future, however, the extent of thermal generation's importance within the sector's overall resource mix will increase as demand continues to increase.

In the analysis of emissions reductions from electricity generation, the estimated savings in electricity consumption from all sectors (industrial, commercial, residential and governmental) have been incorporated into a model that also includes factors describing (a) the marginal emissions of CO2 per kWH consumed, (b) the degree of market penetration achieved by the ESCOs and the labeling and standards program, (c) the degree of coincidence observed between peak, intermediate and baseload periods in the system demand curve and loads stemming from use of certain types of household appliances (such as residential lighting, refrigeration, and space heating and cooling) along with well-defined uses such as street lighting.

a. The marginal emissions factors vary for each year between 2004 and 2013, and are drawn from an internal analysis prepared by UTE. This document includes a detailed review of the operating characteristics of existing generation capacity in the country as well as the generally accepted efficiencies of plants of the type that will be built in Uruguay in the next decade – specifically combined-cycle facilities fired with natural gas. While it is true that total generation from a fossil-fired resource may vary dramatically from year to year because of variations in hydroelectric availability – a feature of the Uruguay system that has been used to justify use of lower, *average* factors in calculating system-wide emissions – it is also the case that the projected electricity savings will not exceed 2.3 percent of total output by Uruguay-based generation assets in 2002. This is well within the *average* percentage share of thermal generation reported by UTE for its system Including deliveries from Salto Grande but not Argentina or Brazilian generators from 1995 to 2001, which was over 10 percent.

b. The degree of market penetration achieved for the ESCOs is assumed to be faster than what is expected for the labeling program, reflecting the increased difficulty of achieving broader customer acceptance of the potential for energy savings.

c. The degree of coincidence observed for specific types of appliances and specific energy uses are based on recent analysis of the market for appliances and a broad range of electric equipment as part of the design of the labeling and standards initiatives within the Program.

- *Hydrocarbon fuels*. Savings in the consumption of liquid fuels, primarily fuel oil, stem from projects that reduce consumption directly as well as the conversion of existing systems utilizing fuel oil and other petroleum products to the use of natural gas in more energy-efficient configurations made possible by use of this cleaner fuel. Since natural gas has a lower carbon content, fuel switching yields emissions reductions, which are amplified by any actual savings in terms of GJ resulting from changes in processes, energy-use configurations or other features. In instances where natural gas is already the baseline fuel, potential sources of savings have also been identified.

In the rural sector, the delivery of solar home systems to households that currently use kerosene, LP gas or electricity from batteries charged using diesel generators or other fossil sources is estimated at slightly more than 1,200 tons of CO2 per year or 12,000 tons of CO2 over ten years.

- *Cogeneration*. The potential capacity in Uruguayan industry is about 40 MW, equivalent to less than 2 percent of current installed capacity. The emissions reductions result from the improvement in net efficiency in the consumption of primary energy derived from cogeneration, and therefore result irrespective of whether the baseline and project fuels are fuel oil, natural gas or a mix.

Incremental Cost Analysis

Implementing the EE Project would require incurring incremental costs to remove barriers to otherwise commercially viable EE projects with substantial global environmental benefits. The incremental costs to be supported by the GEF are defined as the difference between the economic cost of the Baseline Scenario and the GEF Alternative. Below are the baseline scenario, the GEF Alternative, and the incremental cost for each component.

A. Baseline Scenario

At present, very limited financing of sustainable energy efficiency projects is occurring in Uruguay. Some new investment in plant and capital by commercial and industrial energy consumers is having and would continue to deliver improvements in energy efficiency (secular trend energy efficiency improvements), albeit not as a result of a specific effort to target efficiency gains. The Baseline Scenario reflects a limited degree of market development. A realistic assumption, therefore, is that some energy efficiency projects, by UTE (under the IBRD-financed Power Transmission Loan not targeted by the Project), the two private ESCOs operating in Uruguay, and energy end-users, will be implemented over the coming years. However, the GEF alternative (Project Scenario) calls for a significant acceleration in the rate of activity by USCO and other ESCOs.

At present, availability and acquisition of efficient equipment and appliances is limited, and the awareness among consumers of saving opportunities is inadequate to induce consumer-driven demand and develop a sustainable market for such equipment and appliances. Standards for equipment and construction materials are old and require updating. Existing testing institutions do not test for energy efficiency. The current labeling system is limited to the thermal performance of buildings. Despite its participation in regional initiatives, Uruguay has made little progress in applying testing and labeling procedures to household appliances. As demand for and imports of natural gas increase, and in the absence of any labeling and consumer awareness program or aggressive marketing and customer financing programs by the natural gas distributors now active in the country (as envisaged under the baseline scenario) new, more efficient natural gas appliances are unlikely to receive significant attention. Without the GEF support, DNE involvement will be constraint to the business-as-usual and the market transformation activity will not occur.

Under the baseline scenario, the delivery of EE services would not be widely implemented in the medium term. The current economic recession in Uruguay stemming from the financial crisis of 2002 underscores the realism of this forecast. Without the GEF support, the in-country capacity to develop and implement EE services on sustainable basis will develop slowly, thereby exacerbating the energy balance of the country in favor of higher cost of energy import or supply capacity expansion. Despite the utility benefits of energy efficiency savings, UTE lacks experience to comprehensively address and capture the saving opportunities and ensure consumer retention. Without the GEF support, USCO will not be created. In the absence of USCO-led initial projects, the commercial viability of energy efficiency investments cannot be demonstrated and private ESCOs would not venture into new, unproven business opportunity. As a result, the opportunities to capture the potential energy savings buried in the utility bills of the customers will be lost.

In the absence of USCO, UTE will not advance in the implementation of the country's rural electrification program, falling short on its obligations to provide access to electricity to all citizens, including those located in isolated rural areas. For these areas, the baseline calls for a limited implementation of solar systems by UTE for the supply of electricity to public institutions only, with no plan for the electrification of households.

In the absence of GEF-funded barrier removal activities, the total investments in under the Baseline Scenario, including incipient EE activities, meanwhile, is US$57.9million. This estimate is based on data obtained from the proto-ESCOs active in Uruguay at present, an assessment of their future prospects, an evaluation of the potential for sales of appliances and equipment, a business as usual situation, and UTE's current plan for the electrification of remote public institutions.

B. Project Case: GEF Alternative

The Project Scenario (GEF Alternative) calls for removal of barriers to energy efficiency that would result in intense market development and transformation activities, a higher penetration and implementation of energy efficiency goods and services, and the implementation of the first phase of a solar home system program for isolated rural households. Removal of identified barriers would result in energy efficiency investments valued at US$81 million over the 4-year implementation period. This will be supported by public and private EE financing (US$54.225 million), IBRD loan (US$14.500 million), GEF grant (US$6.875 million), and UTE and DNE's local contribution (US$5.4 million).

C. Incremental Costs

The implementation of the proposed Project will produce substantial reductions in greenhouse gas emissions in Uruguay by initiating and sustaining the market for energy efficiency products and services. By removing barriers to energy efficiency, it is estimated that US$81.0 million in energy efficiency expenditures (including US$2.0 million for SHS program) could be supported by the Project during the 4-year implementation period, yielding carbon dioxide reductions of over 1,420,000 tons over the next ten years.

The total incremental cost of the project is US$6,875,000 in GEF funds and will cover barrier removal activities. It comprises the GEF technical assistance, the contingent grant and the equity grant. The project will produce incremental global benefits of 1,220,000 tons of avoided CO2, at a cost to the GEF of US$5.6/ton CO2 (or about US$20.7/ton carbon).

With regard to the SHS program, expected contribution to the reduction of CO2 emissions will be 12,000 ton in a 10-year period, as reflected in the Incremental Cost and Benefit Matrix below. However, from the country point of view, the implementation capacity built by the project would allow Uruguay to extend the electrification program to the envisioned 6,000 rural households and reduce about 72,000 ton of CO2 of emissions, taking into consideration a SHS' life of 20 years. Under these assumptions, the GEF cost would be US$3.8 per ton CO2.

Incremental Costs and Benefits Matrix

	Baseline	Alternative	Increment
Domestic Benefit	• Limited investment in EE measures, appliances and equipment • Inefficient use of primary fuels • Continued reliance on energy imports and capacity expansion to meet demand growth • Use of solar systems limited to community services	• Barriers to EE development, implementation and financing reduced or eliminated • Widespread and substantial savings in energy expenditures (thermal and electric); increased O&M savings, improved economic efficiency; reduced imports; improved fuel efficiency and utilization; lower levels of harmful local emissions. • Extending the use of solar systems to households as well	Over ten years: • 209 kTPE in hydrocarbon fuels saved • 971 GWh of electricity saved • 2,118 GWh in cogenerated power
Global Environmental Benefit	• Base case energy efficiency market investments leads to maximum of 0.20 million tons CO2 reductions.	• Investments in energy efficiency, yielding 1.42 million tons CO2 reductions (incl. 12,000 tons CO2 for the solar home system investment).	• Reduced CO2 emissions (1.22 million tons)
GEF Incremental Costs			
GEF Technical Assitance Grant	*0.0*	*1.825*	*1.825*
GEF Contingent Grant	*0.0*	*1.000*	*1.000*
GEF Equity Grant	*0.0*	*4.050*	*4.050*
Total GEF Incremental Cost	**0.0**	**6.875**	**6.875**

Annex 3: STAP Roster Technical Review
URUGUAY: UY- Energy Efficiency

Annex 3

Thank you for the opportunity to comment on the Uruguay Energy Efficiency Project Concept Document. In general I believe it is a well-designed and valuable project, with a high probability of success. Here are my specific comments.

We concur with the opinions of the GEF STAP reviewer. Herewith are our comments as follows (in italics):

1. With respect to the strategic context (p. 2), another relevant policy is the CDM element of the Kyoto Protocol. Recognizing that GEF-funded activities cannot qualify for the CDM, the project still could lead to CDM opportunities by removing barriers to energy efficiency opportunities in Uruguay beyond the direct activities of the project.

We agree. However, the GOU wanted to keep separated the programs supported by GEF from those that could be implemented under the CDM. Almost any GEF barrier removal type project like this will help to contribute to improving the enabling environment for future CDM activities- however we feel that there is a clear distinction between this and for example, a project that would more directly lead to the development of CDM activities. This project clearly focuses on the upfront barrier removal versus future project development.

2. Concerning barriers to energy efficiency (p. 5), I suspect that another barrier is the limited availability of energy-efficient products or service providers in Uruguay. The strategic choices section makes it clear that increasing the availability of efficient products and service providers are goals for the project, but this should be preceded by discussing the lack of such products and providers at the present time.

We agree. The activities proposed to be implemented under the project will help to overcome the limited availability of EE products and service providers in Uruguay.

3. Regarding activities,

a) another area they might pursue is to consider reducing import duties on energy-efficient products such as CFLs, based on analysis of the potential benefits including reduced energy imports from increased penetration of efficiency measures should tariffs on these products be reduced;

We appreciate this suggestion and will discuss it with the GOU. The project includes assessment of duties and taxes paid by EE products as part of the initiatives that will be proposed for open discussion as input to energy policy formulation.

b) information dissemination might include development and promotion of a web site

on efficiency measures and options;

We agree. Information dissemination will include development and promotion of a WEB site.

c) commercial heating and air conditioning products are another category that could be added to the testing, labeling and standards effort.

We agree. Testing, labeling and standards efforts will be flexible to incorporate these appliances, as well as any other equipment with high potential in terms of energy savings.

d) regarding the solar PV component for off-grid rural households, I think this is a good idea and useful component of the project. But experience from many GEF and other solar PV projects in rural areas has demonstrated that it is critical to involve and support private companies that are marketing, installing, and servicing PV systems. This is critical for the long-term functioning of PV systems installed through the project, as well as for broader PV market development. The project should NOT follow the model of PRODEEM in Brazil where PV systems were bought in bulk by the program and given away, with little attention to working with, training, and supporting businesses engaged in PV installation and service. I suggest adding GEF funding for the purpose of helping establish if necessary and training PV entrepreneurs, and possibly using local businesses for implementation of this component.

Under the solar PV component of the project, UTE will support service providers in rural areas –with possible NGOs participation-, which will be in charge of installation, maintenance and billing collection. This pilot will test if SHS, which could be the least cost solution, could also be sustainable from an operational and economical point of view.

e) I suggest caution in establishing a utility-based energy service company (USCO) as part of the project. UTE and DNE should support the development of an ESCO infrastructure in Uruguay, but not try not to compete with independent ESCOs. A utility-based ESCO should focus on activities that independent ESCOs are not performing, such as assisting residential consumers. This component of the project also could provide support to independent ESCOs--to help attract them to Uruguay, provide technical and business-oriented training including training in performance contracting, fund or co-fund audits that these ESCOs would conduct, and possibly work on a financing mechanism for ESCO projects.

We agree. The USCO proposed by UTE will pioneer ESCO-type activities in Uruguay, opening the market for independent ESCOs, but will not compete directly with them. . The project will support the development of incipient ESCOs with training, development of ESCO instruments, and financing mechanisms.

4. Regarding the budget, it may be helpful to increase funding for the testing, labeling

and standards component (say to $1 million) if a wide range of products are covered and activities carried out in this area.

We agree. The testing, labeling, and standards component is a core element of the project. We expect to introduce enough flexibility in the final project design, so funding could be allocated to the most promising activities in a dynamic way, with close Bank supervision.

Howard Geller
GEF STAP Reviewer

URUGUAY
Energy Efficiency Project
ABBREVIATIONS AND ACRONYMS

AFAP	Pension Fund Administrators
BROU	Banco de la República Oriental del Uruguay (state-owned)
CAS	Country Assistance Strategy
DINAMA	National Directorate of Environmental Management
DNE	National Directorate of Energy
ECLM	Energy Conservation and Load Management
EE	Energy Efficiency
ESCO	Energy Service Company
GEF	Global Environmental Facility
GHG	Green house gases
GOU	Government of the Oriental Republic of Uruguay
GWh	gigawatt hour
IADB	Inter-American Development Bank
IERR	Internal Economic Rate of Return
kW	kilowatt
kWh	kilowatthour
ktoe	thousand tons of oil equivalent
LATU	Technology Laboratory of Uruguay
MERCOSUR	South-America's Southern Cone Common Market
MIEM	Ministry of Industry, Energy, and Mining
MVOTMA	Ministry of Housing, Territory Arrangement, and Environment
MW	megawatt
NPV	Net Present Value
OPP	Office of Planning and Budget
PCD	Project Concept Document
PID	Project Information Document
PJ	Penta Joule (10 15 Joule)
PMU	Program Management Unit
SHS	Solar Home Systems
SOE	Statement of Expenses
TA	Technical Assistance
T&D	Transmission and Distribution
TOR	Terms of Reference
TWh	terawatthour
UNDP	United Nations Development Programme
UNIT	Technical Standards Institute of Uruguay
URSEA	Electricity and Water Services Regulatory Unit
USCO	Utility-based ESCO
UTE	*Administración Nacional de Usinas y Transmisiones Eléctricas* (National Power Utility)

Additional GEF Annex 5: Technical Annex
URUGUAY: UY- Energy Efficiency

Description of project components

This Technical Annex provides a description of the Project from two perspectives. The first reviews the Project in terms of the functional components supported or leveraged with Project resources – market development, implementation investment and project management, the categories utilized in the Project Design Summary presented in Table 1 (next page). The second reviews each of the three key conceptual components of the Project and outlines the baseline situation from which the Project begins, describes the activities involved in each component, and presents the results anticipated.

In addition, the methodology used to estimate emissions reductions is included in the last Section of this Annex.

Presentation by Functional Component

The presentation included here parallels the components in Table 1.

Market development. A total of US$3.35 million in GEF resources will be received and administered by MIEM to conduct various market development activities, as described below.

1. Technical assistance. Implementation of the Program will require specialized support for the various aspects contemplated. Resources will be administered by MIEM with the participation of other institutions as appropriate, and with input from the Bank as needed.

a. Policy and economic analysis and development. Funds will be used to support the development of recommendations on policies and regulations to promoting Energy Efficiency (EE). The newly implemented regulatory framework creates substantial new opportunities for private generators and cogeneration, which is crucial to the success of this program, but other policy initiatives that could stimulate broader EE activities needs further development. MIEM, with Bank input and guidance as appropriate, will seek expert advice on mechanisms for building incentives for EE into the regulatory framework. The studies conducted would likely include analyses of taxes and financial regulations affecting EE, as well as the feasibility of creating an EE fee on every end-user's electric bill, similar to the system benefit charge or "1% for efficiency" levies employed in many U.S. states and Brazil, respectively.

b. Training and capacity building. Training and education programs, including a best practice program, and technical and commercial assessments will be organized by leading technical and academic institutions in the country. The Faculty of Engineering at the Universidad de la República, for example, already has substantial laboratory and testing capabilities, is active in energy audits in industrial facilities as part of its academic activities, and has build an initial portfolio of already implemented or proposed EE interventions in industrial facilities. The best practice program will also capture lessons learned during implementation of

Table 1 - Project Design Summary

Project Components / Sub-components	Inputs (budget)	Project reports	Components to Outputs
(Detailed comments below)			
Market Development 1. Technical assistance: a. Regulatory framework b. Training, education, public information and dissemination, and best practices c. Standards, testing and labeling d. ESCO contractual development e. Market monitoring and evaluation 1. Pipeline and project development	▪ US$ 5.35 million, including US$3.35 million from GEF (Technical Assistance Grant: US$1.73 million; Equity Financing:0.62 Contingent Grant: US$1.0 million)	▪ Implementation and completion reports ▪ Project Management Reports ▪ Supervision reports ▪ Audit reports	▪ Commitment of other participants and partners ▪ Customer acceptance
Investment Implementation a. USCO (DSM and SHS) b. EE services provided by ESCOs	▪ US$73.75 million, including US$3.43 million in GEF-funded (Equity Financing), US$14.1 million in IBRD resources, US$ 3.0 million in UTE resources, and US$53.23 million financing from public and private entities.	▪	▪ Appropriate counterpart/ third party/ commercial funding ▪ Lower than expected financial rate of return ▪ Public sector entities use life cycle concept to buy equipment ▪ Public sector entities are allowed to use savings to pay performance contracts with ESCOs
Project Management Support to Project Management Units	▪ US$1.9 million, including US$0.1 million from GEF (Technical Assistance Grant), US$0.4 million in IBRD financing, US$0.5 million in UTE own resources, and US$0.9 million in DNE resources.		▪ Appropriate institutional arrangements and managerial and technical capacity of all participants
Total	▪ US$81.0 million, including a US$6.875 million grant from GEF.		

projects by third parties, such as by organizing contests among industrial and commercial users involved in EE activities, following the model of the Multilateral Investment Fund for the development of small and medium enterprises. Programs such as these would be strengthened with a view to complementing the activities undertaken in the context of the labeling and testing program (item 1.c, next) and in order to expand the cadre of trained professionals needed to work

within the governmental and private-sector organizations involved in EE. MIEM, with input from the Bank as appropriate, will work with the appropriate academic (UdeR, ORT, and others) and private sector institutions (CIU and others), along with CONICYT, to implement these programs.

c. Standards, testing, and labeling program. MIEM/DNE, with support from Uruguayan Institute for National Standards (UNIT) and consultants, will complete the detailed design and implement the standards, testing and labeling program, including the EE voluntary endorsement label, and will appoint the members of the Stakeholder Steering Committee for the program. UNIT has the technical expertise to assess the implication of choosing different testing protocols for measuring product energy performance and helping to establish energy performance criteria. Further, UNIT is a member of two key regional organizations working on the potential harmonization of standards and labeling programs – the MERCOSUR Standards Organization (AMN) and the Pan-American Standards Commission (COPANT). The further implementation of the program will involve: (i) interacting with the laboratories with testing facilities in the country that will support the program, and then selecting the required test protocols and implementing facilities; (ii) conducting training and promotional activities required for effective and accurate implementation; (iii) establishing the appropriate efficiency criteria for each product (main household appliances, lighting equipment, building thermal envelope, and industrial equipment), communicating and reviewing them with the relevant stakeholders; and (iv) establishing the certification process required for the maintenance and enforcement of the program.
The development of *minimum* energy performance standards, as a complement to the energy labeling program, will be evaluated by the Stakeholder Committee at the time of the mid-term review of the project. Depending on this evaluation, a decision will be taken on the development and enactment of the regulatory basis for mandatory labeling and eventually, minimum energy performance standards.

d. ESCO capacity building. The emerging Uruguayan ESCOs have strong technical capabilities, and have even begun developing effective marketing efforts, but do not have as much experience with the contractual and financial issues that are vital to securing financing and implementing performance contracts. Resources will be used to support dissemination and use of standardized or reference contractual instruments (performance contracts and independent verification protocols) with the support of qualified consultants and experts. Training for ESCO officials in EE finance, as well as work on the development of the mechanisms to support ESCO-based projects (the UEEF) will also be supported. MIEM will establish and launch the UEEF in collaboration with DINACYT, and subsequently it will work with the technical and financial specialists at UEEF to provide capacity building for the ESCOs.

e. Monitoring and evaluation. Monitoring and evaluation (M&E) will build on methodologies developed for similar World Bank/GEF activities, with particular attention to deriving guidelines for non-grant GEF mechanisms. Technical assistance has been identified and a budget of US$400,000 is allocated in the proposed cost structure to: (i) confirm baseline during the first year of project implementation; (ii) monitor market transformation and achievements of development and global objectives against benchmarks—to be developed during project preparation and agreed upon before GEF CEO Endorsement; (iii) assess implementation progress

during a mid-term review and take corrective actions (if any) to stimulate the market; (v) assess achievements of project objectives at project completion; and (vi) demonstrate to stakeholders the global and local environmental benefits of energy efficiency activity through dissemination of project/program results. Measurement and verification will be developed at both the project and program levels. Specifically, each individual ESCO project will include an M&E component as the savings must be verified as part of the performance contract and confirmed in order for savings payments to be made. Market transformation indicators specific to the labeling program and the solar home systems will be developed to monitor and assess program sustainability. DNE will implement the M&E component of the project; it will be responsible for collecting and aggregating performance of energy efficiency projects (including energy savings and global benefits) implemented by GEF beneficiaries (USCO and other ESCOs), for monitoring market development and transformation, and for reporting and disseminating performance results and experience learned.

f. Pipeline and project development. Given the liquidity limitations affecting all commercial and industrial enterprises in Uruguay to a greater or lesser extent depending on the extent to which they generate hard-currency revenues through exports, some new businesses in Uruguay could find it difficult to secure resources for project development and early-stage investment. Accordingly, this Program component is intended to channel contingently reimbursable resources to the emerging ESCOs for the purpose of project development. These resources would be used to capitalize the UEEF's contingently-reimbursable lending window.

Investment implementation. UTE and MIEM will use US$3.425 million of the GEF grant (Equity Financing) for investments in USCO and for supporting ESCOS through the UEFF, respectively.

a. USCO activities (DSM). (GEF: US$1.425million) A business plan for UTE's ESCO division, USCO, is in place. It calls for two types of offers to end-users in the residential, commercial and governmental sectors. The first involves performance contracting based on audits of the end-user facility and a standard-offering for residential users, in which USCO equity (provided partly with the GEF grant resources leveraged by UTE resources) will be leveraged with IBRD financing to invest in three- to four-year contracts. The second involves cash-based sales in which the purchaser will receive a rebate (paid for out of a portion of the GEF funds) calibrated to approximately $300 per kW of load reduced. USCO's business plan calls for some $5 million in investment in the first four years of the Program, with anticipated sales in Year 4 of about $1.8 million and avoided electricity consumption of about 45 GWH over the four years. The focus of USCO's marketing efforts will be the communities of Colonia del Sacramento, Ciudad de la Costa and San José.

b. USCO activities (EE electrification of dispersed rural populations through SHS). (GEF US$ 0.275 million) Studies by UTE indicate that there are some 1,800 homes in small settlements in the interior of the country, and another 4,200 homes in more remote locations, that lack access to electricity. Estimates of the willingness-to-pay of these individuals or families suggest a monthly budget of about US$10 for energy, which is currently spent on lower-quality sources, including batteries, kerosene, gas and/or candles. The program, to be implemented by USCO, will consist of two sets of two parallel bids: (i) for purchase of SHS packages; and (ii) to

select *rural energy service providers* located in the communities that will install and maintain the systems for a period of five years. Each SHS recipient will pay a tariff of no more than US$10/month. Ownership of the SHS would be transferred to the recipients after the five-year lease expires. The GEF resources allocated to this program will be leveraged with a contribution by UTE, financed with the IBRD loan, and the payments of the end-users. The program is expected, in its first two phases, to deliver electric service to about one third of the 6,000 homes identified, and lay the groundwork for a follow-on third phase after project completion in which additional systems would be purchased for installation in the remaining homes using the same USCO-rural energy services company model.

c. Performance contracting by ESCOs. (GEF: 1.725 US$ million) The emerging ESCOs will have access to debt and equity financing from UEEF for their portfolios of performance contracts, the development of which will have been supported in part by contingently recoverable loans made by UEEF, out of the $1-million GEF grant for pipeline and project development. The GEF resources allocated to equity investment will be place with UEEF for management either as equity placements in the emerging ESCOs, subordinated debt or straight debt in the event that such companies do not wish to take on new investors. UEEF's activities are expected to evolve over time as it and the ESCOs gather financial strength. In the first phase, it will provide financing according to the modalities described with resources received from the GEF grant. In a subsequent phase, UEEF will seek an investment-grade rating for Uruguay in order to issue debt to the AFAPs (pension funds), which by law are required to invest in Uruguay, have substantial liquidity at present, and are in principle interested in placing resources with UEEF. UEEF will also seek other sources of commercial financing for onlending to the ESCOs. . Beyond helping the ESCOs, UEEF's activities will also catalyze Uruguay's other financial institutions to begin lending to ESCOs and to industry and business for energy efficiency projects they will implement on their own or on a turn-key basis with ESCOs and engineering firms. Finally, in its mature phase, UEEF may determine that its role should evolve to that of a guarantee facility to provide credit enhancements for ESCOs seeking financing from other financial institutions. This evolution is described in a series of graphics presented in Figure 3.

Project management. (GEF: US$0,1 million). Other resources totaling 1.8 million (US$0.40 million from IBRD financing, US$0.9 million from MIEM's and US$0.5 million from UTE's own budget) will be used to support Program implementation, through funding the formation and activities of the Program steering committee formed by representatives of DNE, UTE and DINAMA, and the Project Management Units in DNE and UTE. The immediate activities of the steering committee would include:

- Formation of the Advisory Board of the UEEF, which will be chaired by MIEM/DNE and will include representatives of MIEM/DNI, DINAMA, OPP, DINACYT, CONICYT, and UTE. The Board's first action, in turn, will include selection of the UEEF staff. UEEF's technical staff will include, at minimum, two individuals, one with extensive experience in fund administration and the other an engineer with training and experience in energy efficiency and cogeneration. MIEM and the Advisory Board may determine that the long-term sustainability of the Fund will be enhanced if it is transferred to a commercial or public sector financial institution, such as the BROU.
- Formation of the Stakeholder Steering Committee for the standards, testing and labeling

program, as described in item 1.c under "Market Development," above. UNIT will be responsible for integrating the stakeholder sectors into the activities of the Steering Committee and ensuring adequate transparency and communications.

Presentation by Conceptual Component

The project consists of three primary conceptual components: (i) the standards and labeling initiative; (ii) the creation of the UEEF to support private ESCOs operating primarily in industrial and commercial facilities; and (iii) the creation of USCO by UTE to undertake DSM projects among residential and small business customers, as well as the implementation of an off-grid energy supply program utilizing solar home systems.

Standards and labeling initiative

Baseline situation

Electric appliances enjoy a high degree of market penetration in Uruguay. A majority of households have storage tank water heaters and refrigerators, as well as smaller appliances such as audiovisual equipment. A smaller, but still significant, number of homes have clothes washers and dishwashers. Significant energy efficiency improvement is possible in several of these appliance types for residential use, along with key applications in the commercial and industrial sector.

Uruguay's domestic appliance manufacturing sector produces a limited number of appliances and models. These include: water heaters (electric), stoves (electric, combination, and gas), and space heating units (gas and electric). In 2001, domestic manufacturers supplied 90% of the total electric water heater market, 42% of the electric and combination stove market, 15% of the gas stove market, 24% of the electric space heaters, and 22% of the gas space heaters market. It is not unusual for domestic manufacturers to import the same product they manufacture or other products with the same brand. The national companies are not subsidiaries of international firms.

Given the limited manufacturing sector in Uruguay, the majority of appliances sold in Uruguay are imported. These products include air conditioners, gas water heaters, freezers, washing machines, washer/dryers, dishwashers, microwaves, refrigerators, dryers and lighting products. The primary sources for Uruguay's imported appliances include Brazil (refrigerators, clothes washers, freezers, and gas stoves), China (air conditioners, electric heaters and microwaves) and Italy (electric stoves, automatic clothes washers, electric water heaters and dishwashers). A significant number of lamps, lighting systems and ballasts come from within MERCOSUR region. Currently, no programs are in place to encourage efficiency through appliance energy labels and/or minimum efficiency standards in Uruguay. The proposed program includes both the design and implementation of an appliance labeling program.

Obstacles to deployment of efficient appliances. Institutional capacity building, program development, and investments in manufacturing and regulatory infrastructure take time. In any country, benefits of standard-setting and labeling programs will start to accrue immediately, although it is likely that demonstrable energy savings will take five to ten years to noticeably

accumulate in some countries. Benefits will accrue more rapidly over the following 10-20 years depending on appliance product stock and rates of replacement. Thus, standard-setting and labeling program require a mid- to long-term energy policy perspective.

A primary obstacle to the development of a market for more efficient appliances in Uruguay is consumer sensitivity to first costs, and lack of information about appliance operating costs. Even if purchasing a more expensive but more efficient appliance is highly cost effective, consumers may not know realize how much they are likely to save in operating costs, or even be aware of differences in energy use.

Description of standards and labeling program components

In the initial energy labeling effort included in the project, the GOU will focus on a voluntary endorsement label. The endorsement label will essentially offer a "seal of approval" to a product that meets certain pre-specified criteria. There are numerous advantages of beginning with a voluntary program; two of the most important are:

- A voluntary program facilitates acceptance of the program, allows manufacturers to gain comfort with the idea of energy efficiency labeling, and increases the likelihood that they will eventually support a mandatory program.

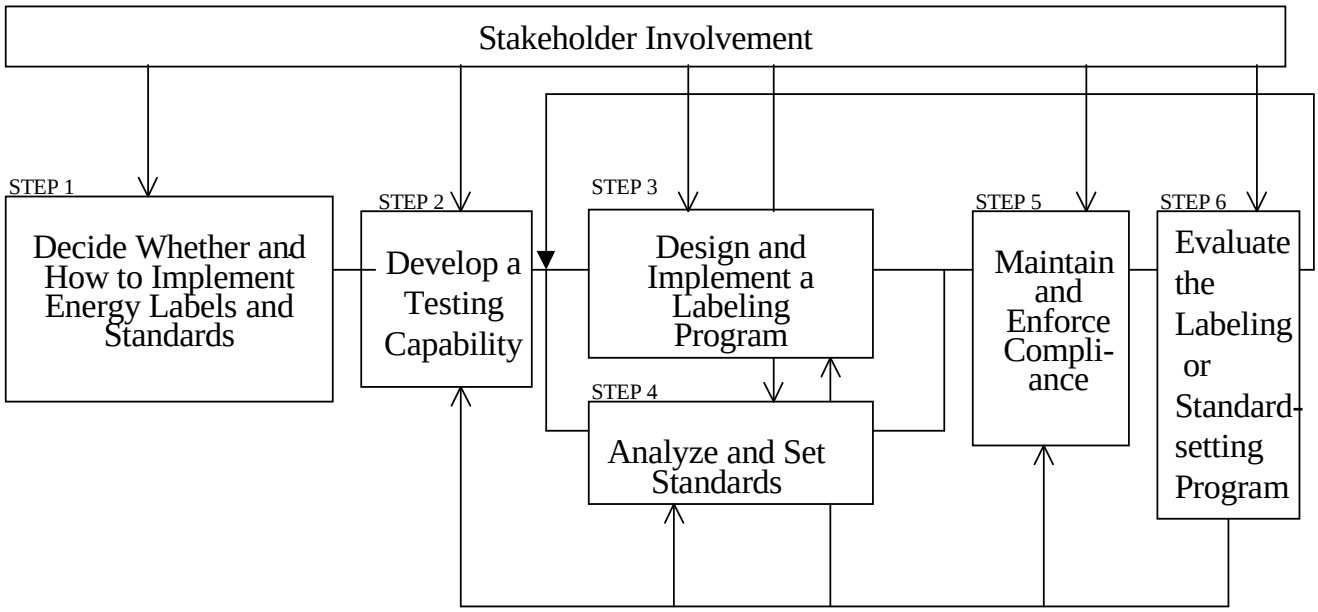
- A voluntary program for a few products allows for a quick start to the labeling effort while additional test facilities are accredited and framework legislation is enacted.

The development of Minimum Energy Performance Standards (MEPS) is not within the scope of the proposed labeling program, however, a transfer from a voluntary labeling program to mandatory standards program will be evaluated by the Steering Committee as part of a mid-term review process.

UNIT and DNE, with initial assistance from standards and labeling experts, will ensure that the establishment of voluntary energy label for appliances, lighting products, and other electrical equipment will be based upon a benchmark performance level as determined by the designated test procedure for each product. The voluntary performance level will be determined through benefit cost analysis and weigh the costs to manufacturers and society of the more efficient against the benefits in terms of reduced consumer energy bills and deferred electrical generating capacity, plus related environmental benefits. As the program moves further, the steering committee can review establishing mandatory minimum energy performance standards.

Experience shows that standard-setting and labeling is most effective when the process involves all stakeholders from the onset and when all analyses, interactions and decisions are open to full scrutiny by all parties. In this project, work label development will be as transparent a process as possible, with the active involvement of DNE, UNIT, industry, NGOs and consumer groups.

Figure 1: Steps in Development of Energy-Efficiency Labels and Standards Programs for Consumer Products



Source: CLASP Guidebook

The main focus of country technical assistance will be on building national capacities for labeling program development, implementation and evaluation. Labeling work will include consumer focus groups to gauge which label designs best communicate with consumers and lead them to purchase energy efficient products, taking into account cultural differences and various decision factors. It will also include the development of a targeted information campaign.

Organizational roles and responsibilities. The stakeholders involved in the labeling program include the lead agency (DNE) and a Steering Committee. DNE's efforts will be complemented by UNIT, the National Standards Organization of Uruguay, which will play the key role of coordinating all of the relevant stakeholders for the program. One of the keys to ensuring the success of these public sector initiatives is the strong involvement of the private sector from the outset of the program design, and UNIT has an existing relationship with manufacturers, importers and exporters.

- DNE. DNE would be the lead government agency involved in the design and implementation of the energy efficiency testing and labeling program. As part of the Ministry of Mines and Energy, DNE has the mandate of proposing and coordinating national energy policies, passing legislation and ensuring compliance. DNE sets programmatic energy priorities and is the principal coordination link between other public and private institutions in Uruguay and in the MERCOSUR region. As a policy priority, DNE is interested in improving efficiency through a voluntary program.
- UNIT. As the Technical Standards Institute of Uruguay, UNIT will be hired under MIEM to help implement the labling program. UNIT has the technical expertise to assess the

implication of choosing different testing protocols for measuring product energy performance and helping to establish energy performance criteria.

DNE, in conjunction with UNIT will coordinate the efforts of representatives of key stakeholders involved throughout the program, including manufacturers, retailers, consumer and environmental groups and NGOs. Both will ensure these stakeholders are involved throughout each step of the labeling program. Based on organizational missions and mandates, the following roles and supporting roles are proposed for each of the major tasks associated with the energy efficiency labeling program.

Figure 2: Proposed Organizational Responsibilities for Program Implementation

Activity	Lead Agency	Assisting Agency
1. Administer and Implement Labeling Program	DNE	UNIT in consultation with Steering Committee
2. Develop a Testing Capability	DNE	UNIT in consultation with Steering Committee, Laboratories and Accreditation Agencies
3. Implement Labeling Program	DNE	UNIT in consultation with Steering Committee
4. Maintain and Enforce Compliance	DNE	In consultation with UNIT and outside consultants. URSEA would be involved under a mandatory labeling regime
5. Evaluate the Labeling Program	DNE	In consultation with steering committee and outside consultants

As noted above, DNE, with UNIT's assistance will be responsible for:

- Defining the detailed technical requirements in consultation with other stakeholders;
- Developing and maintaining the administrative framework for the program;
- Registering, policing, and ensuring compliance,
- Providing information to consumers, including ensuring press and TV involvement in a promotional campaign; and
- Evaluating the program.

Objectives, activities and anticipated results

The specific objective of the voluntary labeling component is to initiate a program of energy efficiency labeling in Uruguay. An energy-efficiency labeling program will address market barriers to high efficiency products by providing consumers with the ability to make more informed decisions about the benefits of these products. This in turn creates a larger market for these products, providing further incentive to manufacturers to market them aggressively. To achieve this objective, the DNE and Steering Committee with technical assistance from international experts will undertake the activities listed below during the project period.

The total cost of the activities described below is estimated at US$1.45 million, of which US$0.25 million would be provided by DNE, while the balance of US$1.20 million would be provided from the GEF Grant through the Technical Assistance to MIEM.

❑ Activity 1: Finalize Design of Energy Labeling Program with all Stakeholders. DNE will lead the process of formalizing the labeling Steering Committee for the voluntary endorsement labeling program, which will be responsible for updating the action plan, and agreeing on an implementation timeline. National and international experts will advise DNE in the implementation of effective labeling program. The Steering Committee will take into account important endorsement labeling efforts in the region for review of potential harmonization efforts. Most of these programs take at least two years to fully implement and will need to be updated to reflect the committee members' view of a realistic implementation schedule.

Consultants conducted a preliminary assessment of data on the energy efficiency of existing products in the market place and have made projections of GHG reduction potentials for the selected products. A market assessment has shown that refrigerators, air-conditioners, electric water heaters, and lighting are priority products for an initial labeling development program.

- Energy Endorsement Label. Target appliances include lighting, electric water heaters, refrigerators and air conditioners are the target appliances for initial implementation of voluntary labeling in Uruguay. For the target products, this task will:
  - Analyze the current market and technical options (this will be taken to a greater level of specificity for the selected product)
  - Train DNE/UNIT in development of a criteria-setting model
  - Establish new efficiency criteria for labeling of the selected product(s)
  - Gather stakeholders involved with the promotion of labels (consumer groups, manufacturers, importers/distributors, NGOS, DNE) and form consensus-building around their roles in implementation.
  - Assist DNE in designing a process to test the proposed labels in Uruguay, with help from a consumer marketing organization in Uruguay

Outputs: An action plan to design, test and promote an endorsement label, and selected design for endorsement label

DNE, in conjunction with the Steering Committee, will consider the various options in the region selects an endorsement label. Next, the group will conduct consumer research to determine the effectiveness of the label design as well as the best format for reaching the target audience. The end result of the consumer research will be a label design that consumers can easily understand and one that appears to be effective.

❑ Activity 2: Develop a Testing Capability. An assessment of the existing testing infrastructure including the existing capacity, the number of new testing laboratories required, and possibilities of upgrading current facilities was carried out. Currently Uruguay does not have a testing program that supports a labeling or minimum efficiency standard level for appliances and lighting. The country does, however, have test facilities that could measure efficiency as well as performance and safety of appliances and lighting, in particular electric water heaters and lighting.

The project envisions Uruguayan institutions testing lighting products and electric water

heaters in Uruguay. Since the test space and most if not all of the equipment are in place in these laboratories, the costs of establishing such capability consist of some additional equipment, acquisition of test procedures, and conducting inter-laboratory comparisons. Refrigerators and freezers, and air conditioning equipment, will be tested through Mutual Recognition Agreements with existing laboratories in other countries, mainly in Brazil or Argentina. GEF would support technical assistance to manage the program and acquisition of some new equipment for the laboratories.

- Task 2.1 Test Facilities and Protocols. DNE and the Steering Committee will convene with all the stakeholders, including manufacturers, to select the most appropriate test procedures for the climate and use conditions in Uruguay with technical assistance from national and international experts. Sub-tasks include:
  - Analysis of test procedures for various kinds of appliances such as lighting, refrigerators, air-conditioners and other electrical consumer durables to evaluate the potential of using existing facilities on a regional basis and avoiding duplication.
  - Discussion on how enforcement is accomplished in other countries, particularly key variances in approach such as whether or not testing is performed at manufacturers' facilities, private third party or government test facilities.
  - Outputs: Recommended test protocol for Uruguay, and plan for coordinated use and management of test facilities throughout the Mercosur region including recommendations for expansion of test capacity and mechanisms for official agreements.

- Activity 3: Implement Labeling Program. This process will include two primary tasks:

- Task 3.1 Conduct of Domestic Workshops. Participants will include lead agency, Steering Committee members, and relevant labeling program stakeholders. The workshops will provide training to key participants in the labeling program to facilitate program implementation and regional coordination for promotion of labeling throughout the Mercosur region.
  - Output: Trained participants in the labeling program

- Task 3.2: Market and Promote the Program. Studies show that the payback to consumers for the target appliances is below three years, and therefore a rebate program is as important as raising consumer awareness about the new energy labels. The project will develop television and radio public service announcements (PSAs) to promote the new endorsement label. Other countries are starting to use PSAs effectively and successfully to promote endorsement labeling programs and this approach. DNE will lead the effort to develop a marketing plan to publicize the label to various consumer groups, achieve recognition. Other stakeholders, such as LATU, UTE and DINAMA have experience with this type of consumer visibility. Specific tasks will include:
  - Design an integrated marketing plan for a public service campaign.

  Develop a campaign in print, public display, audio, and video media can coincide with the launching of the label, with follow-up campaigns in later o program stages.
  - Output: Marketing plan for a public service campaign

❑ Activity 4: Analyze and Set Efficiency Criteria for Labels. UNIT and DNE, with initial assistance from S&L experts will ensure that the establishment of voluntary energy label for appliances, lighting products, and other electrical equipment will be based upon a benchmark performance level as determined by the designated test procedure for each product. To assist the stakeholders, this program envisions conducting three small domestic workshops on draft standards formulation revision and finalization. This will result in enhanced expertise of local stakeholders in implementation of labels and standards programs.

- Task 4.1: Set Efficiency Criteria for Labels. The voluntary performance level will be determined through benefit cost analysis and weigh the costs to manufacturers and society of the more efficient against the benefits in terms of reduced consumer energy bills and deferred electrical generating capacity, plus related environmental benefits. Specific sub-tasks include:
  - o Development of an energy savings model for each product
  - o Preparation of draft efficiency criteria for each product
  - o Convening stakeholders to discuss proposed efficiency levels

Activity 5: Maintain and Enforce Compliance. Currently there is no mechanism in place for monitoring and enforcement of appliance energy efficiency. The program will assist with the establishment of a certification process for appliance energy consumption.

- Task 5.1: Establish a Certification Process. DNE, in coordination with UNIT, will be responsible for enforcement of the labeling program through its contacts with the participating manufacturers and importers. In the long-term, as the lead institutions develop their capabilities and credibility for implementing the labeling program, enforcement responsibility for a mandatory labeling program and for standards will include participation from URSEA. Consultants will be brought in to assist Steering Committee with the design and establishment of the monitoring and certification process. Overall, the program would provide the ability to monitor and enforce compliance with appliance energy efficiency regulations.
- Output: Approved Plan for Certification Process.

❑ Activity 6: Evaluate the Voluntary Labeling Program. For the GOU to maintain an energy efficiency labels and standards program over the long run, it will monitor the program's performance to provide guidance to adapt the program to changing circumstances. Effectiveness of labeling program can be assessed after three years, by a study of the market penetration of efficient products, compared with penetrations at the start of the programs. At this point, stakeholders can also determine the benefits of progressing to a minimum efficiency standards program, and be able to determine effective levels for standards. DNE will work with standards and labeling experts to conduct assessments of the actual energy consumption of the regulated products, the level of consumer satisfaction for new energy efficient models, and the impact on individual manufacturers and their industry overall.

- Task 6.1: Project monitoring and verification. The project will build on the model used in the Efficient Lighting Initiative, in which the program evaluation team is put in place at the project's start to ensure quality data collection and more accurate tracking of

project impacts. The goal of the evaluation will be to provide a comprehensive assessment of the project's effectiveness in terms of several indicators: (i) operational efficiency; (ii) energy and demand savings and the corresponding greenhouse gas mitigation impacts; and (iii) the program's sustained impact in accelerating the adoption of energy efficiency labels. The evaluation will also assess project effectiveness in terms of its success in removing barriers to market penetration for energy efficient appliances, equipment and lighting technologies.

DNE will play the lead role in program reviewing and approving monitoring and evaluation plan and UNIT will be responsible for overall monitoring of the program, and collecting market data on an ongoing basis. The lead agencies will engage outside consultants to actually carry out the evaluation surveys and studies. DNE will carry out a process and impact evaluation with assistance from labeling evaluation experts to determine program costs and benefits as well as greenhouse gas emission impacts. Specific tasks for the evaluation will include:

- Assessment of consumer priorities in purchasing an appliance;
- Tracking consumer awareness levels;
- Monitoring correct display of labels in retailers;
- Measurement of administrative efficiency (such as registration times, etc.);
- Check and verification of manufacturer claims (maintaining program credibility);
- Review influence of the label on purchase decisions; and
- Estimate of energy and demand savings.

Output: Evaluation report

The establishment of effective energy efficiency labels will leads to a more sustainable energy future for Uruguay by creating a market pull for more efficient products. The main outputs of this labeling program will be not only new energy efficiency labels, but also the Uruguayan's capacity to effectively analyze and implement the future revision process with participation of consumers, manufacturers, and retailers.

Prioritization of products for the Uruguay Energy Efficiency Labeling Program. The appliances chosen as high-priorities for the EE program were those with both a high saturation in the Uruguayan market, and a significant potential for efficiency improvement.

- Residential Lighting. Replacement of incandescent bulbs with compact fluorescent tubes is extremely cost effective. Currently, rates of CFL usage in Uruguayan homes are very low, implying a large potential for improvement of residential lighting efficiency. In addition, this technology has the advantage that the turnover rate for light-bulbs is very high compared to large appliances, so that an efficiency program may achieve relatively rapid results.

Electric Water Heaters. Water heating is a leading residential use of electricity in Uruguay. Most homes use a storage-tank type water heater that consumes electricity. The majority of these water heaters are thermally insulated with fiberglass filling, which is a relatively inexpensive and ineffective insulator. Replacement of fiberglass with polyurethane insulation of many water heaters would be highly cost effective, due to the large losses currently

being suffered.

- Refrigerators. Almost every household in Uruguay has a refrigerator, and the number of combination refrigerator/freezers is growing. Refrigeration represents a significant fraction of household energy consumption. Efficiency programs in other countries have proven to result in dramatic and very cost effective efficiency improvements.
- Air Conditioning. Currently residential air conditioning saturation rates are low, but there are some indications that they are growing. Air conditioning is already quite common in the commercial sector. Air conditioning is targeted because of the potential of large growth in this end use, and because of the high energy intensity of this appliance.
- Freezers. Individual freezer units are not as common in Uruguay as refrigerators or combination units are. Nevertheless, this appliance provides the opportunity for significant energy savings, since available insulation technologies can increase the efficiency of each unit dramatically and cost effectively.
- Commercial Lighting. It is estimated that 43% of commercial sector energy consumption is due to lighting. Of lighting, 79% percent is accounted for by incandescent bulbs, magnetic fluorescent ballasts or mercury vapor lighting, all of which can be replaced with more efficient equipment.
- Electric Motors. Electric motors have been shown to account for 60% or greater of industrial electricity use in developing countries. Motors can typically be made 10% more efficient, leading to a significant reduction in the electricity consumption of the entire industrial sector.

Table 2:Summary of Energy Efficiency S&L Programs for Priority Products

Priority Products	Standards and labeling Program Goals
Water Heating	16% of Electric Storage Tank Water Heaters use high efficiency polyurethane insulation. S&L programs can result in 50% efficiency gain using polyurethane insulation.
Refrigerator	Currently, there is only a very low market saturation of refrigerators using high efficiency compressors. A S&L program would target 50% market saturation of refrigerators using high efficiency compressors, resulting in an efficiency improvement of 20% for all refrigerators purchased after program implementation.
Air Conditioning	S&L program would improve the average air conditioner energy efficiency rating (EER) one unit.
Freezer	Currently, the Uruguayan market contains a low saturation of high efficiency horizontal and vertical freezers. A S&L program would result in a 50% penetration of high efficiency freezers.
Commercial Lighting	Currently, commercial lighting makes use primarily of incandescent bulbs, magnetic fluorescent ballasts and mercury vapor lamps. An efficiency program would encourage replacement of incandescent bulbs with CFLs, replace magnetic fluorescent ballasts with electronic ballasts and T12 bulbs with T8 bulbs, and replace mercury vapor lamps with metal halide and high pressure sodium lamps. This would result in a per unit savings of 67%/15%/35% for replacement of incandescent / electronic ballast / mercury lamps, respectively.
Residential Lighting	Presently, almost all residential lighting provided by incandescent bulbs, with a very small fraction of compact fluorescent bulbs. The goal of a labeling program in this case would be the installation of a CFL in one high-use fixture per household.

Existing resources in Uruguay. Implementation of the program will rely on the existence of a significant infrastructure for laboratory testing in the country, as well as extensive expertise in standards and labeling programs as well as testing facilities throughout the region.

- Existing Laboratory Testing Infrastructure in Uruguay. Uruguay has several test facilities that could measure efficiency as well as performance and safety of appliances and lighting. For example, the lighting laboratory at the Engineering Faculty, University of Uruguay tests lighting equipment for photometric performance, voltage, temperature, harmonics, power factor, and equipment lifetime and would need slight upgrades to its equipment to be able to handle the required testing for a lighting certification program.
- Extensive Expertise on Energy Efficiency Labeling Programs and Testing Facilities in Mercosur Region. Due to the presence of additional appliance laboratories in neighboring Mercosur countries, GEF funds could be leveraged through the use of mutual recognition agreements (MRAs) with laboratories outside of Uruguay (particularly those in Brazil and Argentina). Established laboratories in the region can be certified to test products for the Uruguayan market, particularly those not manufactured in Uruguay but manufactured in those countries, such as refrigerators and freezers, as well as air conditioning equipment. Brazil's existing mandatory labeling program is supported by their testing program, supported by CEPEL. Argentina has qualified testing laboratories, such as INTI, run by government and educational institutions. Also, two refrigerator manufacturers in Argentina have private laboratories to test their products.
- Uruguay's Participation in Regional Initiatives focusing on Energy Efficiency Labels. Uruguay participates in COPANT (through UNIT) in that organization's efforts to propose hemispheric energy-efficiency labels. Also through UNIT, Uruguay participates in MERCOSUR attempt to create region-wide labels.
- In-country experience with Environmental and Safety Labeling Programs for Refrigerators and Water Heaters. Uruguayan stakeholders that will be involved in this program have successfully implemented other labeling programs for appliances, including environmental labels for refrigerators.

Criteria for advancing from a voluntary standards and labeling to a mandatory one. Uruguay will begin with a voluntary labeling program to provide adequate time for all stakeholders to get accustomed to a voluntary labeling program and ensure that the process is thoroughly vetted. A key element to this will be the establishment of an extensive comment review period for stakeholders. During this time, the labeling program steering committee will be able to come up with process to accept international test data from outside laboratories. Testing Laboratories will need to be offered to ensure clear testing requirements are in place and that laboratories have adequate time to be brought online.

A mid-term review will be scheduled with the key stakeholders and the Steering Committee for appraising the progress and for reviewing the potential to shift to Minimum Energy Performance Standards. Before doing so, the steering committee will need to assess the impacted industry's ability to scale-up the efficiency of products. The committee will also need to ensure that it can articulate clear process for mandatory testing, listing expectations from laboratories.

Some of the programmatic milestones should include:

- Agreement of all stakeholders of which appliance to prioritize.
- Establishment of standards of labeling and testing procedures
- Update of Testing Facility and Establishment of MRAs
- Design of Endorsement Label
- Determination of Compliance and Enforcement Procedures
- Design of Manufacturer / Importer Outreach Programs
- Achievement of projected market penetration for efficient models of target appliances.

Some measures of success of a Labeling Program include:

- Number of people trained at the S&L workshops.
- Number of products certified for efficiency labeling
- Emissions reductions resulting from new product label
- Number of trained staff at DNE/UNIT
- Ease of adoptability of testing protocols by DNE/UNIT
- Extent to which test practices are consistent with international standards

Anticipated impacts of program

The goal of the program is to transform the national product markets of the targeted appliances, equipment and lighting products. The project will focus largely on capacity building, assisting government, manufacturing, distributing, retail, consumer and environmental stakeholders in Uruguay to implement the most cost-effective energy efficiency measure available. This project will provide heightened awareness, a more solid technical foundation, more extensive trained human resources and regional cooperation that will dramatically accelerate the rate and degree of standards and labels implementation, achieving high-levels of energy efficiency decades sooner than would otherwise occur.

By working with countries in the MERCOSUR Region, this project will help to advance regional harmonisation of testing facilities, testing protocols and mutual recognition of test result and to the beneficial convergence of national standards levels and label designs.

The objectives of this strategy are to strengthen the capacity that has already been built up by other projects as Uruguay pursues new labelling goals and to stimulate a regional sharing of the expertise that is building throughout the region, including Argentina, Brazil, Colombia, Chile, Peru and Mexico. For long-term harmonization efforts, Uruguay will continue to participate in COPANT **1** (through UNIT) in that organization's efforts to propose hemispheric energy-efficiency labels. Also through UNIT, Uruguay participates in MERCOSUR's attempt to create region-wide labels.

In addition to the overall improvement in economic efficiency, which helps rich and poor alike, energy efficiency labels will provide trade benefits and contribute to poverty alleviation. Their reduction of peak demand improves grid reliability, affording better and more stable power to marginal users. The harmonization they provide in the face of appliance globalization reduces trade barriers, which reduces appliance prices to consumers relative to other commodities, making energy services more affordable to poorer people.

Sustainability of the Labeling Program

The Uruguayan government currently levies significant tariffs on energy consuming appliance. There are two main components to this source of government income – import tariffs and VAT. Since the vast majority of appliances are imported, (with the exception of electric water heaters which are primarily domestic), the government receives both revenue benefits from most targeted products under the labeling program. Total tax and tariff rates range from 23% for freezers to 28% for lighting products.

1 COPANT's working group on energy efficiency standards and labels has convened to takes steps to create a timeframe for compiling country information on energy efficiency standards and labeling programs and to move forward on a regional harmonization proposal. The Committee, headed by a representative of the Brazilian Standards Organization (ABINEE) is currently proposing to harmonize the comparison/categorical label, which resembles the European Union, Brazilian, Argentinean and Colombian comparison label. The priority products under considerations for potential harmonization include refrigerators, vertical and horizontal freezers, and residential air conditioners.

Table 3: Ten-year summary of labeling program costs and tariff revenue impacts

Product	Tax and Tariff Rate*	Baseline Revenues	Test Capacity **	Labeling Program Costs**	Incremental Revenues	Net Fiscal Benefits
	% of sales value	US$ millions	US$ millions	US$ millions	US$ millions	US$ millions
Residential Lighting	0.28	0.96	0.30		1.93	0.66
Water Heater	0.24	3.35	0.27		3.74	0.12
Refrigerator	0.26	7.78			8.45	0.67
Air Conditioning	0.28	10.09			10.54	0.45
Freezer	0.23	2.69			3.20	0.52
Commercial Lighting	0.28	n/a			N/A	N/A
Electric Motors	0.25***	0.86			1.72	0.86
Misc. Costs			0.03	1.06		(1.09)
Total		25.72	0.60	1.06	29.57	2.18
*Tax and Tariff Rate based on 2001 sales and government revenues. ** Test Capacity and Labeling Program Costs include WB/GEF Financing and GOU In-kind costs. Labeling Program costs are for four years and include a retail promotion campaign separate from the USCO activities, as well as recurring and non-recurring costs. *** Tax and Tariff Rate for Motors is the average rate across all products.						

The analysis presented in Table 3 is based on projected product sales indicates that government revenues due to taxes and tariffs on more expensive equipment would increase by roughly US$4 million over ten years. Some of this additional revenue could then be reinvested into the efficiency programs, enabling their ongoing success. In addition, this analysis reveals that for the prioritized products, the benefits will significantly outweigh the costs, with a payback period of a less than three years. The purchase of more expensive equipment implies a benefit for both consumers and the government.

On a broader level, the societal result of energy efficiency standards and labeling program is to reduce required investments in new power plants and reduce total fuel consumption for generating electricity. The result is powerful economic gains (such as freeing up capital for investments in non-energy social infrastructure like schools, roads or hospitals) and environmental benefits (such as avoiding carbon emissions). The payback to the government is typically US$400 in net economic benefit to the economy and four tons of carbon emissions reduced for each taxpayer dollar it spends. The U.S. experience with energy efficiency labeling and standards programs dramatically demonstrates the enormous economic benefits. By the year 2020, efficiency standards will have helped the U.S. avoid 38 quadrillion BTUs of energy production. It will also have helped avoid 20% of the country's planned new power generation, roughly equivalent to the energy production of one hundred 500 MW power plants. This translates into expected savings of more than US$100 billion during the next 20 years, a net saving of US$1,000 per household.

Creation of UEEF to support private ESCOs

Baseline situation

Uruguay's private sector exhibits substantial potential for ESCO formation. There are two organizations now operating as ESCOs or proto-ESCOs, and another four that could develop an ESCO business division based on their current energy engineering business. The two proto-ESCOs are MCT Servicios Industriales and SEG Ingeniería. Despite talented and dedicated engineers, they are small, undercapitalized firms with limited access to financing, short corporate histories and limited experience with mechanisms for raising capital and obtaining project finance.

The other engineering and construction firms that could develop ESCO activities are larger firms, some of which have ties to international concerns, that are far more sophisticated in the area of finance. These include: Consultoría y Servicios de Ingeniería (CSI), and its related financial services division, CIEMSA; the construction contractor SACEEM; boiler manufacturer Julio Berkes SA, which enjoyed great success with a performance-contracting based boiler retrofit business in the 1980s, when market conditions made such retrofits attractive; and boiler manufacturer Turboflow Uruguay. Should any of these institutions make a bid to enter the ESCO sector in a concerted manner, there is little doubt that they could bring substantial human and financial resources to bear in the effort.

Obstacles to the emergence of ESCOs. Several factors have prevented the emergence of stronger

private ESCOs in Uruguay to date. The most important of these is the limited access to capital and financing for energy efficiency projects, which stems from the conservative lending culture of Uruguay's banks and the general lack of familiarity with energy efficiency projects and opportunities. It is important to note, for example, that Berkes' investment in boiler retrofits on a performance contracting basis during the 1980s were made entirely using the company's own resources. More recently, MCT's energy efficiency projects, which involve very small investments in measures that offer rapid paybacks (less than one year), have been financed by personal loans made by the company's officers.

Uruguay's current financial crisis is exacerbating this lack of access to financing. In the aftermath of the peso devaluation and the banking crisis in the country, the sector suffers from acute illiquidity. The country's banks lost some 44% of their foreign currency deposits. Bankers have said that when lending resumes, banks will limit their attention to strong companies with strong export-oriented businesses.

At the same time, there is a class of financial institution in the country with significant resources at its disposal. The pension funds (AFAPs) have about US$800 million under management; almost half (44%) of this amount is placed in government bonds, and another 17% are in bond issues from state banks. Increasingly, however, the AFAPs are interested in investing in businesses as the primary agents for beginning the process of injecting credit to various sectors of economy. The AFAPs interviewed indicated that they would be interested in investing in energy efficiency, provided that the vehicle met the basic investment criterion of having a rating of "investment grade."

Description of the UEEF initiative

The fundamental objective of the UEEF is to provide otherwise non-existent liquidity to support the growth of the undercapitalized and underfinanced ESCOs now operating in Uruguay, and to serve as a catalyst for the formation of ESCOs by the engineering and construction firms that could develop such programs relatively quickly.

The UEEF would promote investment in quick-return projects in the initial phase of the program (Years 1-2) with a mix of products intended to support the evolution of ESCOs into commercially viable and sustainable businesses. ESCOs will focus their attention on relatively small, quick-payback projects to build up their project portfolios, repay the loans and gain credibility with UEEF. UEEF, in turn, will strive to demonstrate that it can recover resources by supporting commercially viable ESCOs and ESCO projects, so it obtain an investment-grade credit rating from a financing rating agency and attract a larger volume of commercial resources and leverage the limited GEF-funded investment in the context of the program. Accordingly, these would permit the ESCOs to continue growing. In the ensuing phases of the development of the energy efficiency services sector, ESCOs would access increasing amounts of commercial financing through UEEF (and other sources), and UEEF's product mix would evolve in accordance with the evolution of the private ESCOs. Once the ESCOs reach the mature phase of their development, UEEF's role in the market could evolve toward operation as a guarantee facility as opposed to a lending institution. Should the ESCOs fail to expand and develop

further, it would not be appropriate for UEEF to alter its product mix.

The Program contemplates a series of stages over the first four years of Program implementation, followed by a two-year consolidation phase. Following the formation and consolidation phases, the energy efficiency sector would enter its "mature" phase, during which the central institution proposed here, the Uruguay Energy Efficiency Fund (UEEF), would continue to operate, utilizing any remaining GEF funds, as well as any new resources obtained from other funders during the four years of the project. If the private ESCOs develop to the point where they can access commercial financing, as anticipated, the UEEF would then evolve into a guarantee facility. The four stages of implementation and evolution contemplated in the Program include the following activities and anticipated results:

- Stage 1: Capitalization of UEEF and USCO (Year 0). At the outset, GEF resources totaling US$5,05 million will be dedicated to the development of pipeline projects, investment implementation and management by UEEF, and funds to leverage UTE's investment in USCO, including the solar home systems (SHS) program). MIEM will allocate US$3.175 million of these funds to the capitalization of the UEEF, which will support private ESCOs through a mix of contingent loans, equity and loans during the implementation of the Program. The remaining US$1.875 million will be allocated to the capitalization of USCO for implementation of its first projects and the rural energy program utilizing SHSs. The launch of UEEF and USCO will require completion of the following tasks:
    - UEEF. Formation of UEEF within MIEM, under the supervision of an Advisory Board (described below), and formation of its management team, encompassing the Technical Team and the Financial Team.
    - USCO. Formation of this specialized business unit within UTE, capitalization of USCO with UTE resources and the US$1.875 million from the GEF resources.
- Stage 2A: Formation and early operation of ESCOs (Year 1-2). UEEF would provide initial support to ESCOs in the form of:
    - Equity investments, based on presentation and approval of detailed business plans that should include specific projects for which some evidence of interest on the part of the client is presented;
    - Contingently reimbursable loans for project development, based on presentation of appropriate project documentation;

Initial projects undertaken might offer paybacks of less than one year, and be undertaken on a performance-contracting basis under contracts of two to three years. These contracts should be secured with clients that have a suitable credit rating from one of the rating agencies operating in Uruguay. The preliminary plan for UEEF calls for allocation of US$1.0 million for contingent grants, US$0.15 million in equity placements, US$1.575 million in term loans, and US$0.45 million to cover UEEF's operational requirements during the first year of operation. Operations in subsequent years would be paid for out of reflows from lending activities.

- Stage 2B – Formation and early operation of USCO (Years 1-2). At the same time as the private ESCOs begin developing and implementing performance contracting projects, USCO will implement its initial demonstration projects, using the mix of UTE capital and GEF equity grant, together with financing from the IBRD loan, to implement the project. USCO's initial

market will include residential and small-business users (the focus of the Ciudad de la Costa, Colonia de Sacramento and San José de Mayo demonstration projects), as well as government offices and local governments. USCO will also implement the rural electrification project (see next section). While USCO's business plan is described in greater detail in the following section, it is important to note how USCO's evolution complements that of the private ESCOs supported by UEEF.

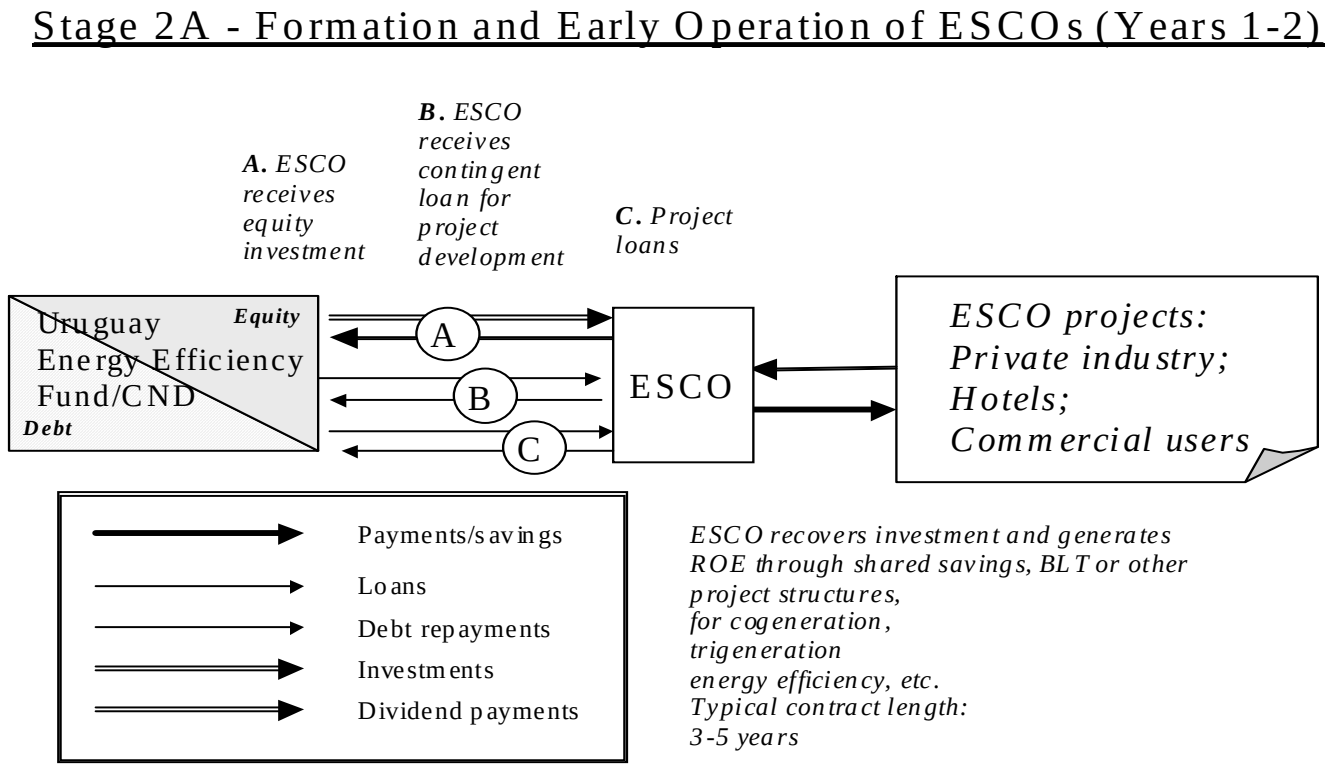
- Stage 3 – Consolidation of ESCOs (Years 2-4). The challenge for the ESCOs as they seek to consolidate themselves as sustainable businesses will be securing fresh capital for project development, preparation and implementation. At the same time, the challenge for UEEF will be to expand its sources of funding. There are substantial resources available for investment in qualified projects through the pension funds (AFAPs). By Year 2, while it is expected that the impact of the financial crisis in Uruguay will have moderated, it may still be impossible for the ESCOs to securing commercial bank financing. However, the AFAPs will be open to the possibility of investing in the UEEF, provided that it meets specific requirements, most notably, that it obtains a credit rating from a local agency. UEEF could enhance its debt rating by taking over the contracts for projects implemented by the ESCOs in the initial, formation stage. The ESCOs would be willing to do this as a way of securing fresh capital to undertake new projects. Once it secures an acceptable credit rating, UEEF could sell a note to the AFAPs as a way of expanding its debt resources for onlending to the ESCOs for implementation of "second-round" projects. Ideally, the UEEF notes issued would have a maturity long enough to finance implementation of the projects, which would be somewhat larger and would require longer contract lengths than projects undertaken in the first round. . At the same time as UEEF's activities help support the ESCOs, its activities will also catalyze Uruguay's other financial institutions to begin lending to ESCOs and to industry and business for energy efficiency projects they will implement on their own or on a turn-key basis with ESCOs and engineering firms.

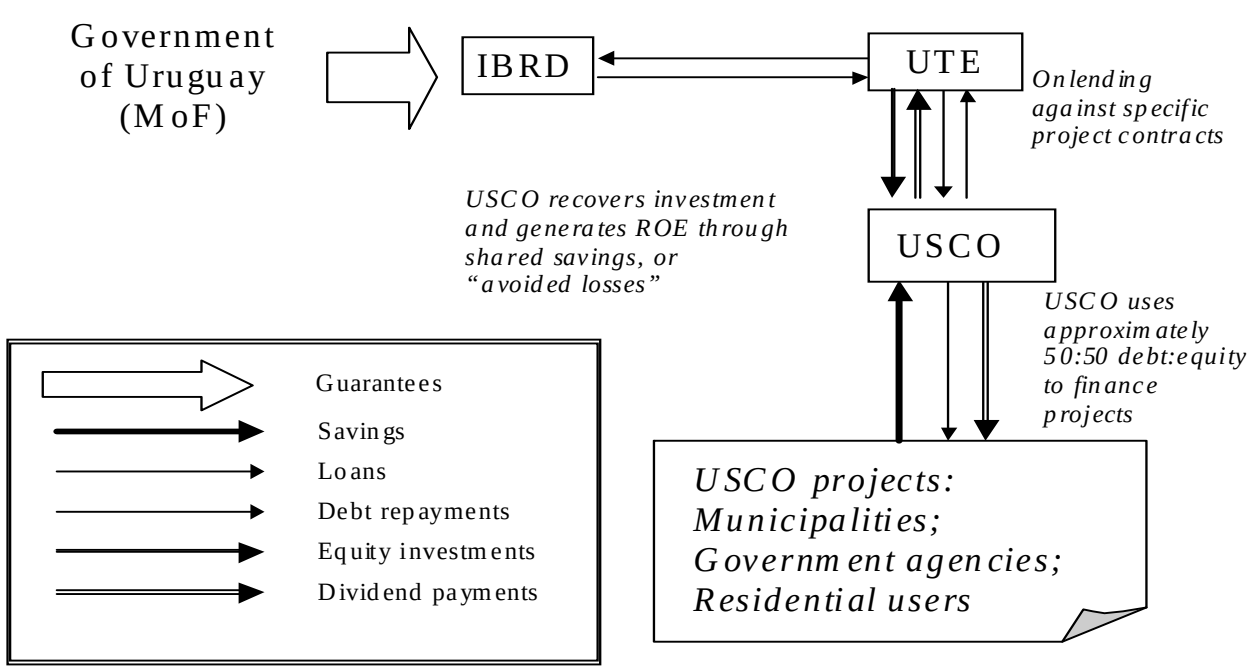
- Stage 4 – ESCOs reach maturity (Years 4-6). By this stage, ESCOs are sustainable businesses with solid prospects for the future. At this point, it will be possible for ESCOs to consider securing commercial debt financing for their projects, although they may still face obstacles because of their limited track records, limited asset base, and lack of familiarity with performance contracting and energy efficiency projects among the bank. For this reason, UEEF may consider the implementation of a commercial loan guarantee facility in addition to its on-going lending activities. Such a facility would provide partial parity guarantees to commercial lenders to ESCOs, backed by a cash reserve created with the remaining GEF resources at UEEF. In this way, UEEF would help finance "third round" projects by the ESCOs.

The five diagrams presented in Figure 3 illustrate the projected evolution of the sector in the program. To summarize, there are three key milestones in project implementation:

- From the capitalization phase (Stage 1) to the formative and early operation phase (Stage 2): UEEF places at least one loan to an ESCO and UTE onlends to USCO;
- From the formative and early operation phase (Stage 2) to the consolidation phase (Stage 3): UEEF secures a credit rating of investment grade;
- From the consolidation phase (Stage 3) to maturity (Stage 4): ESCOs report transactions financed by commercial banks or other institutions besides UEEF.

Figure 3: Anticipated evolution of the UEEF and energy efficiency services sector in Uruguay





Stage 3 - Consolidation of ESCOs (Years 2-4)

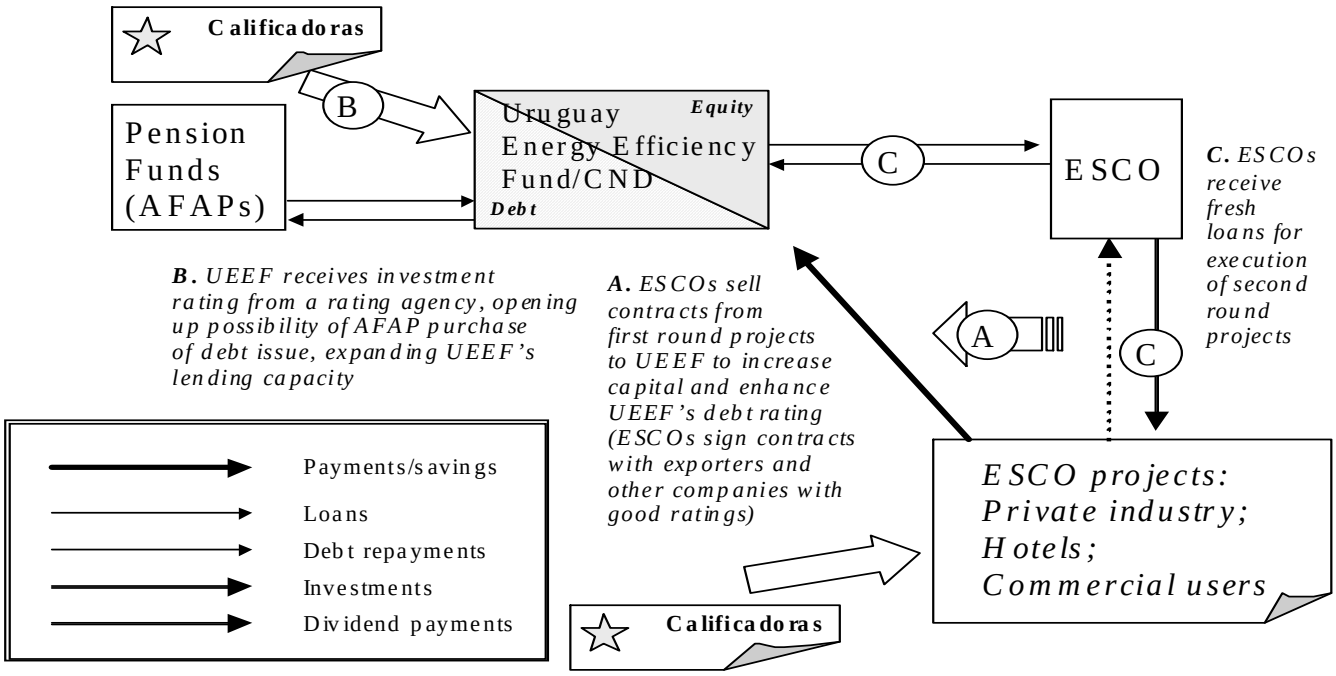
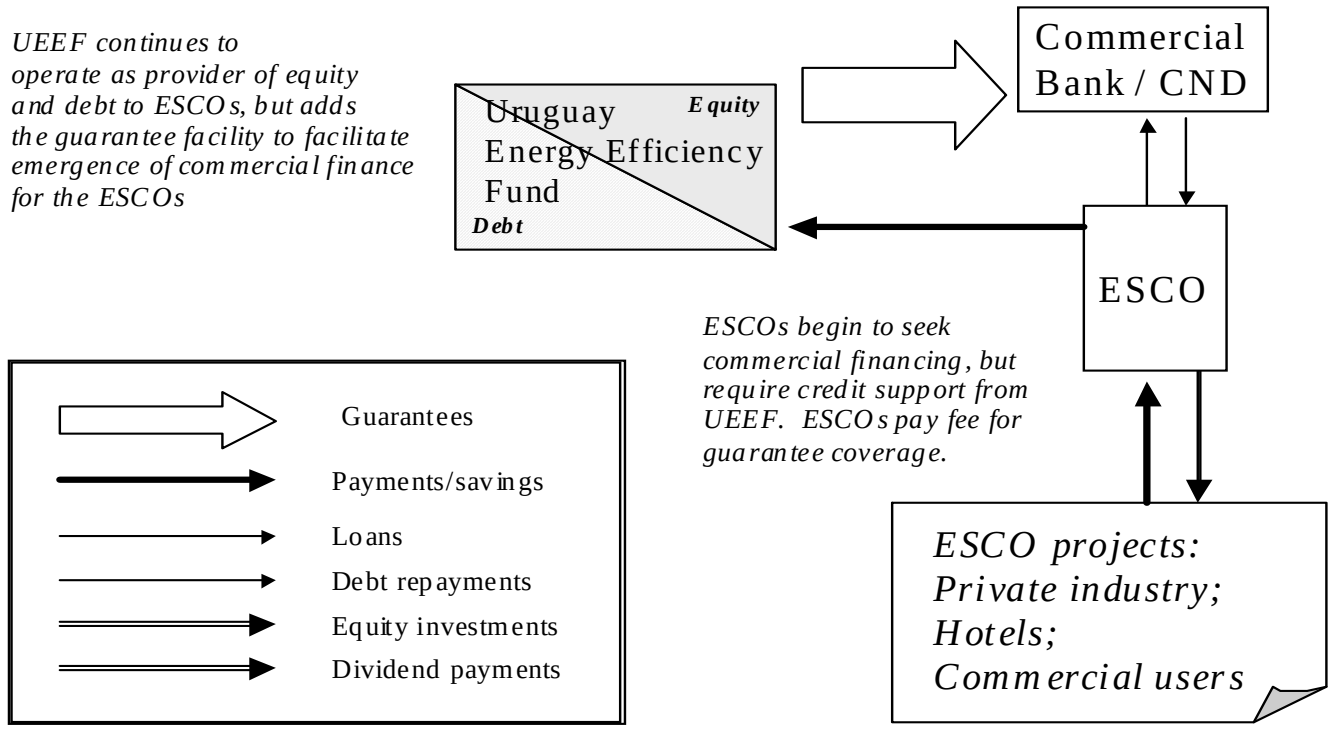


Figure 3, continued: Evolution of energy efficiency sector in Uruguay



Implementing agency and stakeholders. The UEEF will have two divisions, a Technical Team to review, screen and approve projects, and a Financial Team to conduct due diligence and review, manage loan portfolios and oversee collections. An Advisory Board (AB) chaired by MIEM and comprised of leading stakeholders from the energy, industry and financial agencies of the government, will oversee its operation. During the course of implementation, the AB as well as MIEM Program managers and Bank staff will monitor key indicators of ESCO activity to gauge the progress of the energy efficiency sector. If progress towards reaching the trigger points does not occur, the Program managers will be able to recommend changes to address the situation.

- Volume of lending by UEEF to ESCOs and UTE to USCO
- Repayment of contingent loans and commercial loans to UEEF by ESCOs
- Loan repayments by USCO to UTE
- Credit rating of UEEF (by independent rating agency)
- Lending to USCOs from sources other than UEEF

Anticipated impacts of program

The anticipated impacts of UEEF's activities may be categorized in terms of the investments in energy efficiency that it will make directly and those made without UEEF support but catalyzed by the activities of the fund, the environmental benefits obtained as a result of the energy

efficiency improvements, and the reductions in expenditures undertaken by UTE in new generation capacity or purchases of capacity and energy from suppliers in Argentina and Brazil. Each of these is discussed in greater detail below:

- A preliminary model of the UEEF's cash flows for the first four years of operation yields an estimate of US$75,000 in equity placements, US$1.2 million in contingent loans, and US$12.88 million in term loans, with annual operating costs beginning at about $0.53 million and then ramping up to US$1.5 million starting in Year 3 (this includes salaries, overhead and due diligence expenses of $5,000 per project submitted for review, on average). The model assumes that UEEF will charge an interest rate of at least 14% annually, with average tenors for term loans of four years; meanwhile, its debt issues will earn 9% interest on seven-year notes.
- The preliminary model estimates that the UEEF will conduct some 16 due diligence reviews on projects in Years 1 and 2, out of a larger number of proposals that it receives, and then increase that number to as much as 50 by Year 4. The projects that UEEF rejects, either during the first screening before determining which projects should be selected for due diligence, or after the due diligence process is completed, may also result in investment in energy efficiency, however. In addition, some contingent loans issued by UEEF may result in financing or investment not made by UEEF. Finally, it is likely that the ESCOs will undertake a significant number of projects on a turn-key or guaranteed savings basis, without requiring any investment by them directly. For this reason, the level of investment in energy efficiency achieved in Uruguay catalyzed by the activities of UEEF and the other project components is likely to be significantly higher than the total amount of financing provided by UEEF itself. The total investment achieved by UEEF using GEF resources, assuming that pension fund of other commercial resources are available, is estimated at US$14 million. However, the conservative estimates of the total investment that would be economically and technically viable in Uruguay taken from recent engineering assessments suggest a potential of some US$50 to US$ 60 million, which represents about 25% of total viable investments during he next 10 years. Out of that total, some US$25 to US$30 million could be implemented by ESCOs on a performance-contracting basis through UEEF, or other financial institutions that are encouraged to lend more actively to ESCOs as a result of UEEF's example. The remaining investment would include projects implemented in accordance with other payment arrangements that include an ESCO guarantee but no financing (such as compensation for engineering and design studies once savings are confirmed), as well as those projects undertaken directly by business and industry with the involvement of ESCOs and engineering firms on a turn-key basis, or investments undertaken by business and industry using their own technical staffs catalyzed by the marketing efforts of the ESCOs, the standards and labeling program, and the capacity building activities.
- The capacity and energy savings resulting from energy efficiency projects financed or indirectly attributable to the UEEF initiative are estimated at about 40% of total Program savings during the first four years of its implementation. These figures are: almost 50 kTPE in fuels, 500 GWH in cogeneration output and about 240 GWH in electricity.
- The estimated emissions reductions attributable to these savings are 350,000 metric tons of CO2 in the first four years, and some 1.6 million tons CO2 in the first ten.

Sustainability of the program component

The sustainability of UEEF will depend on the success of the management team in promoting the Fund, identifying strong projects and funding them. The preliminary model assumes that the emphasis of the UEEF on contingent loans will shift rapidly to the issuance of term loans to enhance the Fund's cash flow and diminish losses of Fund capital from the failure of such loans to the greatest extent possible. With the emphasis on extension of term loans, the prospects for the Fund's securing an investment-grade rating from a rating agency will be significantly enhanced. This rating is essential for the Fund to secure access to larger volumes of commercial financing for it to expand its operations.

If the additional funding is accessible to UEEF through issuance of a note purchased by the pension funds, the amount of lending undertaken by UEEF could ramp-up considerably. However, in order to significantly increase its ability to originate new loans with these additional resources, UEEF will have to triple its staff of technical and financial managers and maintain the level of contingent loan lending, moves made possible by use of the GEF-funded capital during the ramp-up period after placement of the note(s) – assumed to be Year 3 and Year 4. Once UEEF begins receiving interest and principal payments from these new loans, it will be able to cover operating costs on a continuing basis.

Based on these general assumptions, and more specific ones detailed below, the preliminary model yields the following results:

Assumptions -

- Cost of due diligence study: $5,000
- Average equity placement: US$25,000
- Average contingent loan: US$50,000
- Average term loan: US$100,000 Years 1-2, $250,000 Years 3 and thereafter
- Overhead multiplier: 2
- Closure rate on contingent loans: 33%
- Default rate on term loans: 13%
- Average return on equity placement, net: 15%

Results -

- Number of project due diligence studies performed (four years): 112
- Total equity placements (four years): 3 for US$75,000
- Total contingent loans issued: 24 for US$1.2 million
- Total term loans issued: 57 for US$12.88 million
- Total investment achieved: US$14.155 million
- Years until net operating profit: 5
- Debt coverage after Year 3: 3-4 times

In contrast, with the worst-case assumption that UEEF does not secure any additional resources during the initial four-year period, the Fund could still achieve sustainable use of the GEF-funded

capital of the Fund. To achieve sustainability in the absence of external financing, the emphasis of the UEEF on contingent loans must shift rapidly to the issuance of term loans to enhance the Fund's cash flow and diminish losses of Fund capital from the failure of such loans to the greatest extent possible. With the emphasis on extension of term loans, the prospects for the Fund's securing an investment-grade rating from a rating agency will be significantly enhanced. This rating is essential for the Fund to secure access to larger volumes of commercial financing for it to expand its operations.

Based on the assumptions noted below, the preliminary model yields the following results regarding operations:

Assumptions -

- Cost of due diligence study: $5,000
- Average equity placement: US$25,000
- Average contingent loan: US$50,000
- Average term loan: US$100,000
- Overhead multiplier: 2
- Closure rate on contingent loans: 33%
- Default rate on term loans: 11%
- Average return on equity placement, net: 15%

Results -

- Number of project due diligence studies performed (four years): 62
- Total equity placements (four years): 3 for US$75,000
- Total contingent loans issued: 17 for US$850,000
- Total term loans issued: 21 for US$2.1 million
- Total investment achieved: US$3.025 million
- Years until net operating profit: 5

Even assuming that no new external resources are secured by UEEF, from the pension funds or another financial institution, the model suggests that the UEEF would see the initial capitalization decline steadily over five years, but then it would begin to build up its cash reserves. However, UEEF's cash position in Year 4 and Year 5 would be highly constrained unless it could secure additional resources.

In the event that the term loan lending activities of the UEEF do not generate the rates of repayment required for the Fund to obtain an investment-grade rating, or to be able to use commercial debt, it would be necessary for the Fund to receive new injections of capital from a different source. One possibility would be funds from a special user-benefits charge or similar levy on energy consumption earmarked for investments in energy efficiency.

Formation of USCO

Baseline situation

Until now, UTE has not engaged in DSM activities. The Planning Division of the utility recognizes the need to implement DSM projects to address operational concerns as well as to enhance customer loyalty as UTE prepares for increasing competition in the electric sector in the context of the new regulatory framework being implemented in 2003 as well as the emergence of the natural gas sector in Uruguay.

The profound economic and financial crisis in Uruguay, together with the significant transformation of the country's energy sector, will alter the nature of UTE's business and the marketplace in which it operates. Beginning in 1999, the economic expansion that marked the preceding decade began to falter. In 1999, GDP contracted 2.8% in 1999, 1.4% in 2000, and 3.1% in 2001, and is expected to have shrunk about 10% in 2002. Various analysts predict further economic contraction in 2003, on the order of 2% to 4%. Financial markets in Uruguay have also undergone a severe contraction. It will take a year or more for banks to recover, and in the meantime only limited credit will be available to export-oriented enterprises expected to benefit from the devalued peso. Meanwhile, inflation has quickened while wages have remained frozen at pre-devaluation levels, making it impossible for consumers and smaller enterprises serving the domestic market to obtain credit.

Paradoxically, the mix of recession and regulatory change present opportunities for UTE as well as threats; by creating an energy services subsidiary, USCO, UTE will be in a stronger position to derive benefits from this situation. Typically, ESCOs thrive in environments where consumers have limited access to credit facilities while the ESCO itself has adequate access to financing to provide its services. Given USCO's access to UTE's line of credit with the World Bank, as well as its unmatched customer service network throughout the country, it will be in a position to provide services to customers who cannot expect to obtain financing from other sources.

Energy sector transformation. UTE faces two challenges to its ability to continue serving its customers, the first from within and the second from without. The internal challenge refers to demand growth, which, after a brief slowdown caused by the current economic crisis, will continue to erode the margin between UTE's installed capacity at Uruguay's share of the Salto Grande facility, and the country's peak demand. The external challenge, meanwhile, refers to the expansion of the natural gas distribution grid in the country and the likelihood that UTE customers will switch to natural gas for their cooking, space heating and water heating needs.

It is true that the devaluation of the peso caused electric rates to decrease in real terms while natural gas prices, which are denominated in dollars, have increased sharply. However, this situation is not sustainable, and UTE cannot be complacent about this temporary enhancement of its competitive position in the energy market. UTE and the government will be obliged to increase tariffs, not only to cover its own costs and generate the resources necessary to continue upgrading and expanding the country's electric system, but also to be able to pay for fuel and imported energy, which will tend to reflect prices for fossil fuel. This will affect most residential users and smaller enterprises especially.

Operational considerations. As demand grows, Uruguay's electric sector will be increasingly reliant on thermal generational capacity and imported energy, much of which will come from thermal resources. Consistent with the country's hydroelectric-dominated resource base, in relatively wet years, UTE's thermal generation may amount to only about 5% of total generation, while in relatively dry years this figure can exceed 20%. See Part I for data. Relatively wet years include 1995, 1998 and 2001, while 1999 was a dry year. Energy imports from Argentina also increase during dry years, and while the Argentine grid offers substantial hydroelectric capacity, the marginal units serving Uruguay's energy needs are most likely to be thermal. Over time, therefore, thermal generation will increase as a share of total production.

With increasing peak demand, and the rising costs of meeting it, UTE has a strategic interest in evaluating and exploiting opportunities to reduce peak loads or shift them from thermal supply periods to off-peak periods when hydroelectric capacity predominates. Such strategic initiatives have frequently provided utility suppliers with more cost-effective solutions than simply adding capacity to meet peak demand requirements.

With time, the increased availability of natural gas to residential and commercial and industrial customers, from gas distributors CONECTA, GASEBA and ANCAP itself, will lead to fuel switching efforts. Accordingly, measures to improve energy efficiency in UTE's customer base, while leading to a marginal reduction in revenues, will help create a hedge against customer losses to natural gas suppliers in the future.

Demand for appliance financing. In 1999-2001, UTE designed and implemented a consumer-finance product called SuperPlan, which provided loans for purchase of electric appliances with loan origination at the retailer. Financing was provided by a commercial bank, Santander Personas, with repayment guaranteed by virtue of having repayment be made through the individual borrower's UTE residential service bill. UTE did not include any efficiency criterion in the selection of products eligible for financing. The program was enormously successful in terms of generating appliance sales, and revealed enormous customer demand for financing. The program was discontinued largely because the adverse macroeconomic environment in Argentina and Uruguay, beginning in mid-2001 well before the onset of Argentina's financial crisis, undercut the profitability of the program from Santander's perspective.

Through mid-2001, the results of SuperPlan included:

- Increase in electric appliance sales of 14 % with respect to 2000. Sales appear to have been disproportionately concentrated in the central coastal region of the country, with the Montevideo and Centro-Canelones sectors of the grid accounting for over 60% of sales by the installed capacity they represented in 2002. Analysis based on data provided by UTE.
- UTE's residential sales increased by approximately 3%.
- Commercial activity increased.
- Among the items sold, refrigerators were the most popular, with 40% of items purchased,

followed by hot water heaters, 21%, washing machines, with 21%, electric stoves, with 11%, and heat pumps, with 5%.

- Extensive publicity and national application demonstrated that the concept of consumer finance linked to payment through the UTE bill worked effectively. According to Banco Santander, 80,000 loan applications were received, and 60,000 were approved. Given the relaxed credit criteria applied, this was a high rejection rate, noted a Santander official. Interview with María Michelena Etcheverrito, Risk Manager, Banco Santader-Consumer Credit, December 13, 2002. Some $50 million in financing was issued, yielding an average loan of $833; this suggests that the majority of customers fell into the second category of borrowers, those with monthly electric bills of over 200 kWH.

Demand for electric service and willingness to pay in rural areas. Uruguay boasts a relatively high degree of electrification compared to other countries in Latin America, in part due to its high degree of urbanization. Nonetheless, there are communities that do not have access to grid-supplied electricity, and use other, more expensive sources of electricity or alternatives. Studies by UTE indicate that there are some 1,800 homes in small settlements in the interior of the country, and another 4,200 homes in more remote locations, that lack access to electricity. Estimates of the willingness-to-pay of these individuals or families suggest a monthly budget of about US$10 for energy, which is currently spent on lower-quality sources, including batteries, kerosene, gas and/or candles.

USCO's business plan

Since 2001, UTE's Planning Division has prepared program descriptions for DSM activities in three cities (not including Montevideo) – San José, Ciudad de la Costa and Colonia del Sacramento. These programs would require a total of about US$1.7 million in financing, generating revenues from monthly payments by end-users of approximately US$60,000. With support from the World Bank, UTE has developed a business plan for USCO that contemplates about US$5.45 million in total investment in DSM measures among residential and small business end-users. Resources from the GEF grant for US$1.425 million will support this program.. The remaining $4.10 million in debt financing would come from UTE out of the IBRD loan to UTE.

Alongside the activities in the area of DSM, USCO's rural energy initiative would involve placement of US$2.0 million in solar home systems to deliver reliable and economically priced electricity to off-grid end-users and stimulate the formation of a network of local service providers, as described in the next section.

UTE will have complete ownership of USCO, and will be the implementing agency for the use of the GEF resources as well as oversight of the use of the IBRD loan resources. Implementation of the USCO initiative will involve the creation of the appropriate internal mandate and appointment of key individuals to the management team of USCO from within UTE. There is precedent for this in CONEX, UTE's consulting division specializing in IT and communications support for the Uruguayan government, parastatal firms and even the private sector. For example, CONEX capitalizes on UTE's extensive network of communications systems and

regional offices to provide real-time communications support to the government agency responsible for oversight and management of national elections.

The milestones contemplated in the implementation of USCO include:

- Establishment of USCO as a clearly defined business unit within UTE, with separate accounts, bookkeeping procedures and a dedicated staff;
- Pass-through by UTE of GEF resources for capitalization of USCO;
- Allocation by UTE of its capital commitment to USCO's account;
- Completion of detailed plans for implementation of the three "initial DSM projects" and the rural energy initiative contained in USCO's business plan;
- Implementation of the initial projects and development of follow-on projects.

Oversight of USCO's activities will lie with UTE, and hence decision-making authority for proceeding from one step of the process to the next will lie with the appropriate UTE managers. However, MIEM will have authority to request reports on USCO's operations, and by virtue of its role in the oversight of UEEF, MIEM will have the opportunity to monitor the degree to which USCO and the private ESCOs are competing in the energy efficiency services marketplace (see discussion of competition, next section).

Anticipated impacts of program

The impact of the USCO initiative will be assessed according to the same categories identified in the previous section on the UEEF and the private ESCOs. USCO will deliver results in terms of investment in DSM measures that will yield benefits to the end-users, in the form of economic savings, and to USCO (to the extent that it is profitable), but it should be noted that it will also reduce UTE's sales of electricity in the areas where it operations. A preliminary cost-benefit analysis of the impact of the investments contemplated in USCO's business plan suggest that the DSM investments will generate net benefits with a net present value of US$1.3 million over four years.

A financial model prepared for USCO's business plan projects that total sales will increase from US$200,000 in Year 1 to US$1.5 million in Year 4, and a profit margin of 16% in Year 4, and interest coverage (EBITDA/interest) increasing from about 3 times in Year 2 to 12 times in Year 4. Over the four-year period, the equity value of USCO would increase to about US$2.2 million, based on a multiplier of four times EBITDA.

The projected savings of electricity consumption contained in the business plan are about 30 GWH over four years, delivering approximately 88,000 metric tons of CO2 over ten years.

Competition. The two-track approach contemplated in the Project envisages a separation between the market of the ESCOs and USCO in Stage 1. The EE project will direct provide financial and technical support to USCO to operate in the small business and residential market. ESCOs, on the other hand, will receive support from the project to act in the competitive market of EE services to the industrial and large commercial sectors. Given UTE's technical strength

and knowledge of its own customers, USCO will have a potential advantage relative to the ESCOs in the sectors where it will be supported – which are those sectors that are less attractive to the private ESCOs. Once the ESCOs have been given time and resources to build up their capacities and capitalizations to a preliminary extent (by Stage 2), they could expand their scope into sectors where USCO will be active at the outset, such as government. This process will facilitate the development of private ESCOs.

During project implementation and the mid-term review of the project, the level of activity and market penetration of ESCOs and USCO in the industrial and large commercial sectors will be evaluated to take corrective measures, if necessary. If this review indicates that USCO is taking a market share that is hindering ESCO development, DNE will be asked to take administrative action to control USCO business. On the other hand, if either the private ESCOs or USCO fail to evolve as anticipated, the financial support of the EE project would be shifted to the most successful model.

In addition, while it is certainly possible that USCO may determine that it would benefit from implementing industrial projects in the early stages of its development, there appear to be two factors limiting its interest in these markets:

- UTE engineering staff does not have the experience and the capacity to analyze industrial energy efficiency projects, nor does UTE necessarily enjoy the confidence and trust of private industry to perform the necessary analyses; and

- To date, UTE has indicated that its target markets for DSM are the residential and small-business sectors, likely due, at least in part, to the significant role that these sectors play in UTE's evening peak load, which it would like to control better.

Sustainability of the program component

In the implementation of its business plan, USCO will enjoy significant advantages as a result of its link to UTE. For instance, it will have access to consumption data as well as the power to collect payments from customers through the UTE end-user invoice, along with access to highly competitive financing using IBRD resources.

Nevertheless, the sustainability of USCO will depend on the extent to which UTE perceives that the costs and benefits of its operations justify its continued operation. To date, UTE has expressed a commitment to creating USCO as a strategy for improving UTE's service offering in key regional and end-user sectors. There is the risk, however, that UTE's traditional emphasis on the volume of sales, as opposed to diversified and complementary service offerings, as the primary indicator of corporate success could assert itself and be used to justify altering UTE's relationship to USCO. To the extent that USCO is successful in generating profits, the company would be viewed as a valuable asset and could be spun off from UTE. While this change would erode the strategic advantages USCO will enjoy at the outset, a successful start-up and consolidation of its business would put it in a strong position to compete in the energy efficiency services sector.

Off Grid Energy Supply Program Utilizing Solar Home Systems

Baseline Situation

UTE has the monopoly for energy distribution in Uruguay and the obligation to serve all population. However, to fulfill this obligation by extending the electricity grid to cover isolated rural areas is not economically feasible. To advance the electrification of Uruguay, UTE intends to implement a Rural Electrification program based on Solar Home Systems (SHS) using an ESCO approach to test if this technology could offer the most efficient and cost-effective way to deliver modern electricity to isolated rural households in Uruguay.

For this reason, efficient use of SHS in the proposed project is proposed to be considered as part of Program 5, instead of Program 6.

UTE has not attempted to use this approach so far because of lack of information and experience on the use of SHS to provide energy to isolated rural households, considering the difficulties to operate and maintain these systems and collect service fees in remote areas. These services would also represent a departure from regular UTE's way of conducting business, are not regulated and therefore there is no framework for cost recovery.

The USCO model, due to its flexibility, could offer the possibility to test the use of alternative technologies, a fee for service model, and participation of rural services providers that could offer local services at lower costs. Also, the involvement of the communities benefited by the project could further reduce operational costs.

Due to the need to test and further improve this approach, UTE is looking to receive GEF support to cover the incremental cost of the project during the initial implementation period.

Currently, there are a number of solar systems installed by UTE in institutional facilities in rural areas without access to electricity grids during the last ten years. These systems are providing modern energy to 65 rural schools, 13 rural clinics, and 40 rural police stations in 14 provinces, as indicated in Table 4.

Table 4: Solar systems installed by UTE

Province	Rural Schools	Rural Clinics	Rural Police Stations	Total
Artigas	12	2	6	20
Cerro Largo	8	4	12	24
Durazno	8		1	9
Flores	1		1	2
Florida	4		1	5
Lavalleja				0
Maldonado			1	1
Paysandú	2		5	7
Río Negro	2	1	1	4
Rivera	10	1		11
Rocha				0
Salto	8		4	12
Tacuarembó	6	3	7	16
Treinta Y Tres	4	2	1	7
Total	**65**	**13**	**40**	**118**

The experience gained in the installation and operation of these institutional solar systems during the last ten years have enabled UTE to consider attempting the full electrification of all Uruguayan households by installing SHS in those remote rural areas where they are a cost-effective solution and the cost of expanding the electricity grid is not affordable. However, there is no specific experience on providing services for a fee to households using SHS.

Market studies. Market studies by UTE indicate that there are some 1,800 homes in 145 small settlements in the interior of the country, and another 4,200 isolated homes in more remote locations, that lack access to electricity.

To study the viability of rural electrification based on SHS, UTE compiled quantitative and qualitative information on the energy demand in rural areas, based on a sample of 14 settlements lacking in electric power that were chosen on the basis of information provided by the National Institute of Statistics (INE). This information included: (1) socio-economic characteristics; (2) material and state of conservation of the households; and (3) equipment used for lighting, social communication, cooking and food conservation. At that stage, the investigation was oriented to the analysis of the socio-economic capacity of this sector of the rural population.

In a second stage, a detailed survey has been conducted on the same sample of households in order to determine their monthly expenditures on substitutes for electric power. The dwellers of the surveyed rural households use batteries, kerosene, LPG, candles, and other energy sources which however they could not always obtain in an agile, suitable or satisfactory fashion. On average, they spend from US$ 10 to US$ 12 for lighting. Main results of the survey (adjusted by inflation and rate of exchange) are indicated in Table 5.

Table 5: Monthly expenditures in lighting per household

Source of energy	Unit	Cost per unit	Monthly use	Monthly expenditures
		US$/unit		US$
Candles	Unit	0.10	30	3.00
LPG	Bottle charge	3.90	1	3.90
Dry battery	Unit	0.14	10	1.40
Battery Charge	Battery charge	1.46	1	1.46
Kerosene	Liter	0.28	3	0.84
Total				10.60

The distribution of monthly expenditures on lighting per household is indicated in Table 6.

Table 6: Distribution of household expenditures in lighting

% of rural households	US$ per month
8.3%	6.0 to 9.0
57.1%	9.0 to 15.0
34.5%	15.0 and plus
100.0%	10.60

The people surveyed were informed of the technical characteristics of solar power systems and asked about their opinion on the utilization of this type of alternative energy, and the amount that they were willing to pay for this service. Many people were aware of the existence of this equipment because they had seen it installed in schools and other rural institutions.

Asked about their willingness-to-pay for a SHS, the families suggested a monthly budget of about US$10, which is currently spent on lower-quality sources, including batteries, kerosene, gas and/or candles. Subsidies were designed in order to reduce monthly payment to the willingness to pay level (see figures under Process for Implementation).

Description of the Project Component.
The program will be executed by UTE, through USCO and associated rural service providers. Such arrangement is expected to reduce implementation risks, due to UTE's experience in rural electrification, its presence in rural areas, and the flexibility that would be provided by USCO and private participants. Participation of rural NGOs and rural institutions in the commercial aspects of the project will contribute to reduce costs and enhance community participation. Detailed arrangements for project execution are explained below.

The basic 50 Watt SHS to be installed by the program will have the following characteristics:

- 1 solar photovoltaic panel with a nominal power of 50 Watt
- 1 voltage and current regulator
- 1 bank of batteries of 12 V and 150 Ah
- 3 energy efficient lamps
- 1 main board
- 1 kit of electrical cables
- 1 socket of 25 W for12 V cc
- 1 support of the photovoltaic module

Process for Implementation

The EE project comprises a four-year SHS program consisting of two phases, each one with 1000 SHS. At the end of the project, about one third of the 6,000 homes identified as lacking electricity will have SHS installed. These two phases will lay the groundwork for a follow-on phase (Phase 3), after project end, in which additional systems would be purchased for installation in the remaining homes, using the same USCO-based model to be used during the GEF-supported EE project.

Phases 1 and 2 will be implemented by UTE's USCO through two bids for each phase: (i) the first bid for purchase of SHS packages and (ii) the second one, to select *rural energy service providers* (RSP) who will install and maintain the systems acquired by UTE (with the participation of rural NGOs and rural institutions) for a period of five years under a leasing agreement. Each SHS recipient will pay a tariff of about US$10/month to (i) remunerate the services of the RSP and (ii) repay to UTE the subsidized cost of the SHS (US$615) (see Table 7). Ownership of the SHSs would be transferred to the recipients after the five-year lease expires.

Table 7: Life-cycle costs of SHSs

50W SHS	Installed Cost	O&M and replacement	Total	Monthly Payment
	US$	US$	US$	US$/month
Full cost*	890	300	1190	$13.00
Subsidized cost Phase 1	615	300	915	$10.00
Subsidized cost Phase 2**	615	300	915	$10.00
Willingness to pay				$10

* Estimated cost of installed 50 W SHS is US$890, on the basis of the last purchases made under PERMER and recent offers received by UTE. ** Including a forecasted cost reduction of 6% (US$50) in the full cost of SHS.

Table 7 indicates estimated monthly payments of SHS at full and subsidized cost. Subsidized installed cost was estimated to reduce monthly payment to the willingness-to-pay level. Total subsidy amount during Phase 1 of the Program is proposed to be US$275 (GEF: US$125, UTE: US$150), equivalent to a reduction of US$ 3 in monthly payments. The GEF subsidy of US$125 is the same as the one used in PERMER, an ongoing GEF-supported rural electrification project in Argentina. During Phase 2, a combination of expected cost reductions (US$ 50) and a subsidy of US$225 from UTE would allow to keep service tariffs at the same level of Phase 1. No GEF

contribution for SHS subsidies is considered during Phase 2; in this phase, GEF contribution will be limited to support only project implementation through technical assistance.

Financing plan. Total cost of Phases 1 and 2 of the SHS program is US$2.0 million, including a proposed GEF contribution of US$ 275,000 to partially subsidize the program and help cover incremental organizational, marketing, and monitoring and evaluation costs (see Table 8).

Table 8: Total Cost and Financing Plan of SHS Program

		Total	GEF	UTE (*)	Service Provider
	Number of SHS	US$	US$	US$	US$/month
Phase 1 (Years 1 and 2)					
Number of SHS installed	1,000				
Subsidy per equipment			125	150	
Phase 2 (Years 3 and 4)					
Number of SHS installed	1,000				
Subsidy per equipment			0	225	
Total Phases 1 and 2 (**)					
Cost of Equipment		1,730,000	125,000	1,205,000	400,000
Organization, marketing, and M&E		270,000	150,000	120,000	
Total	**2,000**	**2,000,000**	**275,000**	**1,325,000**	**400,000**

(*) Includes WB financing
(**) Phase 3, electrification of remaining 4,000 households will continue after Year 4.

Management and oversight

The SHS program will be monitored as part of the reporting function of the management unit in UTE, and the supervisory functions of the MIEM and the regulatory agency of the power sector. As indicated in Section D, the program target to be monitored is the electrification of 2,000 isolated rural households with no access to the electricity grid during phases 1 and 2.

Periodic market surveys will contribute to evaluate customers' satisfaction and introduce improvements in SHS design and maintenance. A mid-term evaluation would allow for corrections and modifications, if needed, to increase program positive impact during Phase 2 of the SHS program during years 3 and 4.

A Market Monitoring and Evaluation activity included in the Market Development component of the project, partially funded by GEF, will embrace above activities.

Anticipated Impact of the EE Rural Electrification Program

The program will contribute to provide modern energy to rural populations, reduce pollution inside the houses, decrease adverse health effects, and enable access to modern means of communications. In addition, it would contribute to reduce GHG emission. With respect to the later, assessment of impact is based upon the following assumptions:

- Each rural house with no access to the electricity grid consumes approximately 20 liters equivalent of kerosene per month (similar to the average consumption of rural housings in Argentina).
- Coefficient of emissions: 2.5 kg CO2/lt of kerosene
- Annual emissions per house: CO2 (kg) = 20 * 2.5 * 12 = 600 kg CO2 per year

On the basis of these assumptions, the following emission reductions are estimated:

- Reduction of emissions due to project implementation (Phases 1 and 2): CO2 (ton) = 0.6 ton CO2/house * 2,000 houses = 1200 ton per year
- Potential reduction of emissions with replications during Phase 3: CO2 (ton) = 0.6 * 6,000 = 3,600 ton per year
- Total potential reduction of emissions during 15 years: CO2 (ton) = 3600 ton per year * 15 years = 54,000 ton

Sustainability and Replicability

Sustainability. The previous knowledge of Solar Systems acquired by UTE in its institutional applications (clinics, police and schools) reduces the technological risks of program implementation. Also, experience to be gained on the household application of this technology will be carried over for its longer term plan for full rural electrification.

Financial risks are mitigated by the fact that many potential customers are farm workers, who have fixed incomes, albeit reduced.

The SHS program will be implemented by the USCO being created by UTE under this project. The USCO will undertake DSM projects among residential and small business customers, as well as the off-grid energy supply program, providing focus and continuity to the SHS program and integration to its approach for on-grid and off-grid activities.

Replicability. Implementation of the initial phases of the SHS program by UTE's USCO, will contribute to accumulate experience to complete the electrification of Uruguay, a mandate that UTE is committed to carry on. A successful implementation of the two initial phases with GEF support (Phase 1 with both tariff and technical assistance support; Phase 2 with only technical assistance support) will ensure the continued use of SHS as an efficient technology for off-grid rural electrification, to replace traditional grid extension when this is not economically viable.

If the first two phases are successful, isolated communities and households will put pressure on

USCO to be part of the program and receive the benefits of modern energy through future replications to be financed by UTE-USCO and the rural service providers associated with the project.

Estimate of Emissions Reductions

In addition to the barrier reduction measures contemplated in the Project, initial projects undertaken in the business plans for USCO and the already existing, but small and undercapitalized ESCOs, will generate energy savings. These savings will yield economic as well as environmental benefits, both in terms of emissions of local pollutants as well as reductions in GHG emissions. The replication of these initial activities will have a large multiplier effect in terms of energy efficiency improvements and emission reductions. The Project will also improve the allocation of resources by helping defer investments in energy supply facilities and by expanding the service and price options available to consumers as a result of the competition among energy suppliers to retain customers in a new market-based energy sector.

Direct benefits from the Project include the economic savings obtained from: (a) initial and follow-on projects implemented by the ESCOs and other project sponsors such as industrial end-users; (b) implementation of low-cost conservation investments by energy users (residential, industrial, commercial, and utilities) as a result of the information dissemination program; (c) EE projects undertaken by UTE; and (d) the dissemination of more efficient appliances, equipment and construction materials as a result of the testing, certification and labeling program.

The SHS component will provide access to cleaner, efficient and affordable electricity supply to the rural populations, reduce harmful pollutants inside the houses, and decrease related adverse health effects. Improved reliability of electricity supply would also enable poor households to access modern means of communications. Besides the local benefits, it would contribute to reduce GHG emission. Details of the economic savings of extending SHS to rural residential users, and the emission reduction benefits resulting from the displacement of more expensive sources of energy (including kerosene, batteries, LP gas and candles) are in the Technical Annex.

The Uruguayan experience, including the SHS component, can provide useful lessons for other countries in the Region facing similar barriers to the provisions of electricity in remote areas. To enhance the replicability of the project and this component in particular after project completion, dissemination of project outcomes, including monitoring and evaluation, and regional workshops involving bilateral and multilateral donors, country officials and private investors are envisaged during implementation. These activities will be financed by the GEF technical assistance funds.

Indirect benefits from the Project include the reductions in contaminant emissions as well as the benefits to the national balance of payments associated with reductions in the consumption of fuels produced from imported petroleum. Based on the analysis of the Baseline Scenario and the Project Scenario developed below, the anticipated reduction in GHG emissions derived from Project implementation over a period of ten years is 1.22 million tons of CO2.

Other benefits associated with the Project include the development of a new sector of the economy that requires the talents of trained engineers and financial specialists. The Project also contemplates training and capacity building activities in the academic sector, which will help support the strengthening of the country's institutions for technical education and keep them abreast of technical advances elsewhere in the world.

Description of the model

The potential savings have been calculated based on analysis of the national energy balance and the identification of general areas of potential saving based on a series of visits with Uruguayan industrial facilities in several different sectors conducted by an experienced energy engineer. These were complemented by analyses of the electric appliance and equipment sectors conducted by a leading organization specializing in energy efficiency. In addition, visits with the two ESCOs operating in Uruguay and the leaders of the USCO initiative within UTE, as well as the municipal government of Montevideo, yielded specific estimates based on more detailed engineering analysis.

The engineering team assessing the potential savings in the industrial, residential, governmental and commercial sectors prepared an analysis based on the available data on Uruguayan energy consumption in these sectors. The industrial sector review included estimates of percentage savings obtainable in different subsectors of Uruguay's industrial sector. The engineering team prepared similar estimates for the residential, commercial and governmental while a separate estimate was prepared by the leading energy efficiency organization, based on observations of savings generally obtainable through appliance standards and labeling programs. The results of these two reviews were merged in a spreadsheet model used to aggregate the estimates of savings potential, of savings from the Project, and emissions reductions from the Project.

The estimates prepared by the engineering teams form the basis for a series of inputs in a spreadsheet model that integrates the two engineering and market assessments, generates estimates of the potential energy savings as well as those that actually would be achieved as a result of the Project, and then produces estimates of the corresponding emissions reductions. The model consists of four components, or Modules, which are described below. Figure 4 describes the relationship between the four modules graphically.

1. Industrial savings potential. This table shows the estimated potential savings in industry by fuel type, generated using factors generalized from the results of 11 site visits to major industrial and commercial firms in Uruguay. The list of enterprises visited is contained in Table 11, and the table with estimated potential savings is presented in Table 12. The factors utilized incorporate judgments regarding the economic returns obtainable from process modifications without fuel switching, additional savings made possible by the introduction of natural gas, and equipment upgrades.
2. Aggregation of industrial, residential, governmental, and commercial savings potential. This begins with a set of inputs of individual savings segments in the Project. The results of Table 13, which constitute the inputs for the ESCO sector savings, are combined with sales and

savings estimates taken from USCO's business plan, and the estimates prepared by the standards and labeling program team (Table 12) to form another table, Table 14. This represents the *total potential savings* in Uruguay, and is the source of the summary data presented in Table 9, below

Table 9: Summary of energy savings potential

Sector	Fuels (kTPE)	Electricity (GWH)	Cogeneration Potential (GWH)	Net Savings Primary Energy (kTPE)*	Total Primary Energy Use (kTPE)**	Savings
Industrial	26	108	286	49	452	11%
Residential		31		6	711	1%
Commercial	2	32		6	198	3%
Governmental		7		1	N/A	N/A
Total	29	177	286	63	1,554	4%

.

3. Estimate of savings achieved by the Project. These figures are derived from the data in Table 14, utilizing two sets of market penetration estimates, one for the ESCOs and the second for the Standards and Labeling program. The USCO figures are already based on estimates of market penetration and therefore do not require adjustment. The results of this exercise, including the market penetration estimates, constitute the *estimated savings from the Project*, and are included as Table 15 and are summarized in Table 10, below. Clearly, the savings anticipated as a result of the implementation of the Program would be less than the potential savings. This difference is apparent when the results in Table 9 are compared with those of Table 10.

Table 10: Projected savings from Project implementation

	Years 1-4	Years 1-10	Average Annual	Reference	Average/ Reference	Year 10/ Reference
Hydrocarbon fuels (kTPE)	49	209	21	452*	4.6%	6.35%
Cogeneration (GWH)	501	2,118	212	1,586**	13.4%	18.04%
Electricity (GWH)	194	971	97	7,984#	1.2%	1.92%

4. Estimated of emissions reductions based on estimated savings. The model incorporates estimates of carbon emissions reductions from savings in fuel oil and natural gas, as well as electricity. In the case of the fuel and natural gas emissions reductions, generally accepted emissions factors on the basis of energy content are employed, while in the case of electricity, marginal emissions factors developed by UTE itself are included in the model. The results of this exercise are included as Table 16. The analysis of the results from the SHS program was performed independently, and is not incorporated into the model. These emissions reductions are added onto the results of the model evaluating reductions from the industrial, residential, commercial and governmental sectors.

Assumptions and discussion

Each of the four Modules in the model contains calculations based on assumptions and interpretations that bear mentioning. These are discussed in turn in the following paragraphs.

1. Industrial energy efficiency potential. Uruguay's industrial sector is relatively concentrated in a few facilities, given the size of the country and the companies. This means that relatively high degrees of improvement can be achieved if a limited number of companies undertake energy efficiency measures. This seems appropriate given the tendency in such circumstances for the largest company to serve as a leader for the rest of the sector; when it implements a significant change, ther others are certain to follow. With a reasonable level of information diffusion through the appropriate channels (such as CIU and other institutions), a significant degree of replication seems justified, given that many of the simpler measures contemplated (excluding costs of converting to natural gas) and identified in the site visits offer payback times of less than two years. For the purpose of this assessment, therefore, it is assumed that 75% of the current energy consumption for the sector is affected by the implementation of energy efficiency measures.

A crucial assumption linked to this initial consideration has to do with the degree of penetration achieved by natural gas. With the use of natural gas, a number of efficiency measures are possible that cannot be implemented otherwise. In the near term, as noted above, the natural gas distributors face significant challenges in persuading customers to switch over. Even without considering the issue of how to overcome the price disadvantage, GASEBA's projections call for a penetration of 30% of all industrial facilities, representing 50% of all consumption of liquid fuels. Communication with Marcelo Busquets, director for large customers, GASEBA. For the purposes of this analysis, it is assumed at 80% of those facilities switching to natural gas will concurrently implement efficiency measures.

The estimates generated in the table are conservative, based on the assumption that projects with paybacks in the range of 1.5 to two years will be implemented, and based on prices for energy in line with values recorded before the financial crisis and devaluation, which significantly reduced prices in dollar terms.

2. Energy efficiency potential in commercial, residential and government sectors. Other than the industrial sector, the estimates of potential savings in these three sectors are drawn from two sources. The first is the assessment by the Alliance to Save Energy (ASE) of the savings potential from implementation of the Standards and Labeling program. The second is the business plan for USCO, which is based on preliminary designs and estimates of savings from three projects involving replacement of lighting fixtures and water heating appliances, primarily, in the residential and small business sectors.

The ASE's analysis is based on a review of available household surveys and appliance sales data for Uruguay, as well as theoretical models and experience from other countries where standards and labeling programs have been implemented.

- Colonia del Sacramento, and San José).
- *Standards and Labeling*. The impact of the labeling and standards program is based on a set of market penetration estimates that differ from those applied to the ESCO sector, since the degree of penetration by ESCOs in the industrial sector should be better than the response of the public as a whole to the labeling and standards campaign. The rate of market penetration is

assumed to be slower in the initial four-year period, achieving 40% of the market by the end of that time, but reaching 100% by the close of the eighth year as well.

4. Estimated emissions reductions. The main sources of emissions reductions are savings in electricity consumption, savings in use of hydrocarbon fuels, and efficiency gains on the energy supply side through implementation of cogeneration. The estimate of 1.22 million tCO2 reflects the emissions reductions over ten years generated by the projects implemented in the four-year implementation period, in accordance with the projected savings from the Project. The assumptions relevant to each of sources of emissions reductions are presented below:

- *Electricity*. As noted, Uruguay's electric sector now utilizes a relatively small amount of thermal generation capacity at the margin. The total amount of thermal generation varies significantly, however, depending on the degree to which rainfall makes intensive use of hydroelectric capacity possible or not. In the future, however, the extent of thermal generation's importance within the sector's overall resource mix will increase as demand continues to increase. The model uses marginal emissions factors to calculate emissions reductions from electricity savings. These factors vary for each year between 2004 and 2013, and are drawn from an internal analysis prepared by UTE. This document includes a detailed review of the operating characteristics of existing generation capacity in the country as well as the generally accepted efficiencies of plants of the type that will be built in Uruguay in the next decade – specifically combined-cycle facilities fired with natural gas. While it is true that total generation from a fossil-fired resource may vary dramatically from year to year because of variations in hydroelectric availability – a feature of the Uruguay system that has been used to justify use of lower, *average* factors in calculating system-wide emissions – it is also the case that the projected electricity savings will not exceed 2.3 percent of total output by Uruguay-based generation assets in 2002. This is well within the *average* percentage share of thermal generation reported by UTE for its system from 1995 to 2001, which was over 10 percent.
- *Hydrocarbon fuels*. Savings in the consumption of liquid fuels, primarily fuel oil, stem from projects that reduce consumption directly as well as the conversion of existing systems utilizing fuel oil and other petroleum products to the use of natural gas in more energy-efficient configurations made possible by use of this cleaner fuel. Since natural gas has a lower carbon content, fuel switching yields emissions reductions, which are amplified by any actual savings in terms of GJ resulting from changes in processes, energy-use configurations or other features. In instances where natural gas is already the baseline fuel, potential sources of savings have also been identified. In the rural sector, the SHS program serving households that currently use kerosene, LP gas or electricity from batteries charged using diesel generators or other fossil sources, is estimated at slightly more than 1,200 tons of CO2 per year or 12,000 tons of CO2 over ten years.
- *Cogeneration*. The potential capacity in Uruguayan industry is about 40 MW, equivalent to less than 2 percent of current installed capacity. The emissions reductions result from the improvement in net efficiency in the consumption of primary energy used by cogeneration projects. These are assumed to be "must-run" facilities, since they are tied to industrial output (it is assumed there will be no grid-connected cogeneration schemes) and therefore result in emissions reductions irrespective of whether the baseline and project fuels are fuel oil, natural gas or a mix.

Figure 4: Structure of model for estimating energy savings and emissions reductions

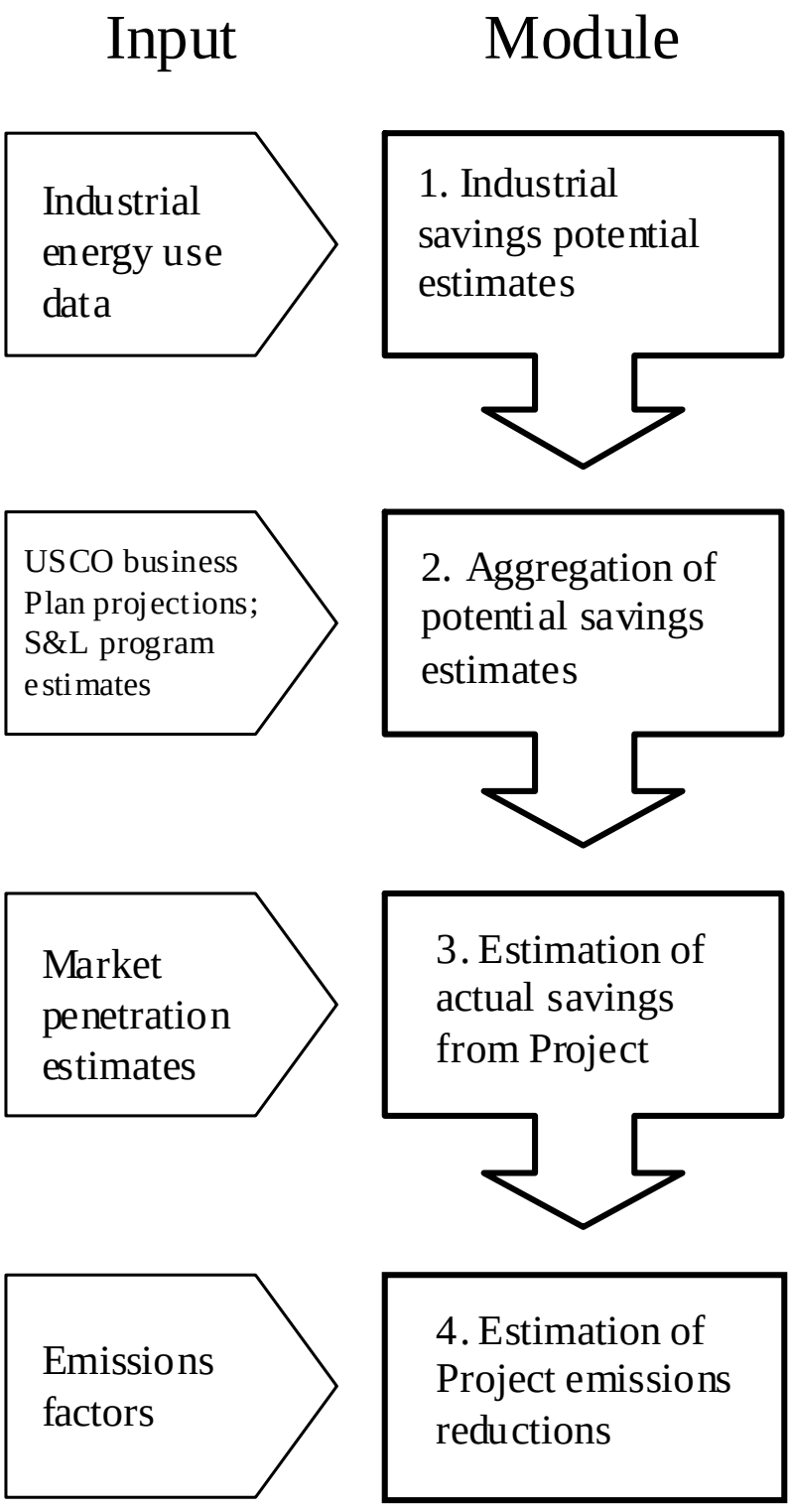


Table 11: Enterprises visited by engineering team in Uruguay

Company	*Sector*	*Observation*
Asociación de Hoteleros	Tourism	Encompasses large number of the major hotels in the country
ANCAP	Petroleum refining and distribution	Monopoly on importing and refining petroleum products
CONAPROLE	Dairy	Largest dairy producer, one of largest companies in Uruguay
Curtiembre Branáa	Leather goods	One of two leading leather goods producers
Dancotex	Textiles	
Fabrica Nacional de Cerveza	Brewing and bottling	One of two major brewers in country
FRIPUR	Fish packing	
Frigorífico Carrasco	Meat packing	
Gerdau Laisa	Steelmaking	Only steel plant in country
EFFICE	Household chemicals	
ISUSA	Fertilizers	
Intendencia Municipal de Montevideo	Government	Largest in country
Pay Cueros	Leather goods	Other of the two leading leather goods producers
Saman	Rice	Largest rice producer in country
Supermercados Disco	Supermarkets	Largest in Uruguay

Table 12: Calculation of Estimated Energy Savings, Industrial Sector

		EE		Fuel oil +GN		Gas Oil+GLP		Leña+Biomasa	
		MWh	MWh	ktep	ktep	ktep	ktep	ktep	ktep
31	Prod. Aliment, bebid, tabac.	565963		40.514		13.894		72.366	
3111	Matanza y preparac. Carnes		143976		11.297		2.165		9.172
3112	Lacteos		98047		15.799		0.986		5.971
3115	Aceites y grasas vegetales		21507		2.767		0.220		7.870
3116	Molinos harina, arroz, yerba		76169		0.109		0.637		3.580
3117	Pan, pastas, galletitas		79276		3.751		2.129		9.130
3118	Ingenios y ref. azúcar		39948		0.123		0.175		20.519
3131	Bebidas espirituosas		4971		1.815		0.042		0.508
3132	Ind. Vinícola		6165		0.164		0.404		0.000
3133	Cervezas		29918		1.122		0.049		10.150
3134	Bebidas s/alcohol		17101		0.915		0.349		2.036
	Otros		48885		2.651		6.737		3.429
32	Textiles, cueros	150651		13.025		0.761		15.801	
3211	Lavadero, hilandería, tejedur.		94463		9.688		0.068		7.993
3231	Curtiembres		30547		2.567		0.231		6.714
	Otros		25641		0.769		0.463		1.094
33	Industria de la madera	16238		0.391		0.866		0.000	
3311	Aserraderos		7272		0.142		0.615		0.000
3320	Muebles y accesorios		7042		0.248		0.236		0.000
	Otros		1924		0.001		0.015		0.000
34	Papel y prod. de papel	105591		12.843		1.179		7.848	
3411	Pulpa madera, papel, cartón		64300		11.783		0.703		7.848
3420	Imprentas, editoriales		32201		0.335		0.284		0.000
	Otros		9090		0.725		0.192		0.000
35	Productos quimicos	239843		48.761		2.293		3.066	
3511	Ind. Quimicas basicas		55005		0.559		0.234		1.849
3522	Prod. Farmaceuticos, medic.		18726		0.680		0.026		0.000
3530	Refinerias petroleo		34569		40.034		0.854		0.000
3560	Productos del plastico		77653		0.007		0.147		0.214
	Otros		53890		7.482		1.032		1.003
36	Productos miner. n/metal.	119789		44.686		2.392		12.862	
3620	Vidrio y prod. De vidrio		17594		2.334		0.046		0.041
3691	Prod. Arcilla p/construcc.		13149		0.514		0.299		4.711
3692	Cemento, cal y yeso		64141		38.382		1.082		4.801
	Otros		24906		3.456		0.965		3.309
37	Ind. Metálicas básicas	59216		1.767		0.234		0.130	
3710	Ind. Básicas hierro y acero		50516		1.334		0.214		0.130
	Otros		8700		0.433		0.020		0.000
38	Maquinaria y equipos	73371	73371	2.388	2.388	1.044	1.044	0.427	0.427
39	Otras ind. Manufactureras	5746	5746	16.625	16.625	0.036	0.036	0.000	0.000
TOTAL		1336407	1336407	181.000	181.000	22.700	22.700	112.500	112.500

Table 12, continued

Ahorro termico situac. actual	Adicional con gas natural	Ahorro Energ. Electr.	Cogeneracion Potencia	Cogeneracion energia
ktep	ktep	MWh	MW	MWh
1.23	0.98	4319	5.4	21596
1.47	1.31	2941	6	30000
0.72	0	645	0	0
0	0	2856	8	50000
0.87	0.41	2378	0	0
0.52	0	0	1.1	4335
0.16	0.07	149	0	0
0.01	0.01	185	0	0
0.85	0.23	1122	1.18	7053
0.22	0.06	641	0	0
0.41	0.19	1467	0	0
1.33	0.71	2834	2.02	14169
0.70	0.37	916	1	7000
0.14	0.07	769	0	0
0	0	273	0	0
0	0	264	0	0
0	0	72	0	0
1.47	0.47	2411	6	50000
0	0	725	0	0
0	0	205	0	0
0.04	0	1238	0	0
0.01	0	421	0	0
8	0	25500	12	102000
0	0	2912	0	0
0	0	2021	0	0
0.07	0	528	0	0
0.16	0.71	394	0	0
1.30	0	1924	0	0
0.20	0	747	0	0
0.11	0	1515	0	0
0.03	0	261	0	0
0.08	0.05	1651	0	0
0.50	0.27	129	0	0
20.58	5.90	64415.18	42.68	286154

Table 13: Estimates of Savings from Standards and Labeling Program

Market Segment	Characteristics of equipment		Market size: 2003-2007 Projections[i]		Annual Energy savings				Supplier's market	Inclusion in labeling program	
Equipment or technologies (*)	Equipment currently in the market	EE alternative	Avg. Annual sales No.	Annual sales US$[ii]	Baseline Total energy use[iii]	Potential energy savings[iv]	Penetration in 5 years	Annual savings in 5 years	Number of manufacturers / importers	Priority order[v]	
Residential Lighting[vi]	Incand.	CFLs	14 mill[vii].	$2.8 mill.	241 GWh	75%/ fixture	26-52%[viii]	50-100 GWh	24-30		1
Space heating									6-Mar		6
Water heating[ix]	Fiberglass insul.	Polyureth.	70,000	$6.3 mill.	792 GWh	25%	5-10%	9-18 GWh	21-Mar		4
	Incand.	CFLs	Incl. in residential sales	Incl. in residential sales value	205 GWh	67% per lamp	25 – 50%	34 – 69 GWh	24-37		1
Commercial lighting	Fluor T12 w/ magnetic ballast	T8s w/ electronic ballast	n/a	Need estimate	318 GWh	15% per fixture	25 – 50%	12 – 24 GWh	4		
Street and area lighting (HID)	Mercury Vapor	HPS and MH[x]	n/a	Need estimate	76 GWh	35% per fixture	25 – 50%	7 – 13 GWh	5		
Refrigerators	imported	Compressor/ insulation	51,868	$21 mill.	261 GWh	20-36%	33%	18-33GWh	17-Dec		3
Air conditioning	8.9 EER	10 EER	13,000	$10.4 mill.	53 GWh	12%	62%	3.9 GWh	46		5
Electric motors	1-200 hp[xi]	Better materials	n/a	n/a	4575 GWh[xii]	3-7%[xiii]	n/a	240 GWh	n/a		2
Freezers	Imported	Compressor/ insulation	9,000	$3.4 mill.	56 GWh[xiv]	43%	48%	11.5 GWh	12-Jul		3
Ceiling Insulation[xv]	R0-R7	R22+	35,000 housing starts/ retrofits	n/a	5.5 kBTU/sq. ft.	n/a	18%	26 GWh/year [xvi]			6
Wall Insulation	R0-R7	R27+	35,000 housing starts/ retrofits	n/a	6.7 kBTU/sq. ft.	n/a	18%				6

Table 14: Estimated Total Potential Savings

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Hydrocarbon fuels											
FO in industry	20.58	20.58	20.58	20.58	20.58	20.58	20.58	20.58	20.58	20.58	205.
NG in industry	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	59.
NG in commercial	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	22.
Total Fuels (kTPE)	28.68	28.68	28.68	28.68	28.68	28.68	28.68	28.68	28.68	28.68	286.
Industrial cogeneration											
Total cogeneration in industry (MWH)	286,154	286,154	286,154	286,154	286,154	286,154	286,154	286,154	286,154	286,154	2,861,5
Electricity											
Electricity in industry	64,415	64,415	64,415	64,415	64,415	64,415	64,415	64,415	64,415	64,415	644,1
Electricity from industrial motors	43,200	43,200	43,200	43,200	43,200	43,200	43,200	43,200	43,200	43,200	432,0
Electricity in residential	24,560	26,590	27,710	28,830	29,949	31,157	32,608	34,348	36,436	38,942	311,1
Electricity in commercial	25,063	27,093	28,213	29,333	30,452	31,660	33,111	34,851	36,939	39,445	316,1
Electricity in government	3,462	4,477	5,037	5,597	6,156	6,761	7,486	8,356	9,400	10,653	67,3
Total Electricity (MWH)	160,700	165,776	168,575	171,374	174,172	177,193	180,819	185,170	190,391	196,656	1,770,8

Table 15: Estimated Actual Savings from Project

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Rate of penetration--ESCOs	15%	30%	60%	70%	80%	90%	95%	100%	100%	100%
Rate of penetration--Labels	10%	20%	30%	40%	50%	70%	90%	100%	100%	100%
Hydrocarbon fuels										
FO in industry	3.09	6.17	12.35	14.41	16.46	18.52	19.55	20.58	20.58	20.58
NG in industry	0.89	1.77	3.54	4.13	4.72	5.31	5.61	5.90	5.90	5.90
NG in commercial	0.22	0.44	0.66	0.88	1.10	1.54	1.98	2.20	2.20	2.20
Total Fuels (kTPE)	4.19	8.38	16.55	19.42	22.28	25.37	27.14	28.68	28.68	28.68
Industrial cogeneration										
Total cogeneration in industry (MWH)	42,923	85,846	171,692	200,308	228,923	257,539	271,846	286,154	286,154	286,154
Electricity										
Electricity in industry	9,662	19,325	38,649	45,091	51,532	57,974	61,194	64,415	64,415	64,415
Electricity from industrial motors	4,320	8,640	12,960	17,280	21,600	30,240	38,880	43,200	43,200	43,200
Electricity in residential	3,045	7,466	10,976	14,486	17,996	23,986	30,217	34,348	36,436	38,942
Electricity in commercial	3,095	7,566	11,127	14,687	18,247	24,338	30,670	34,851	36,939	39,445
Electricity in government	641	1,969	2,843	3,716	4,589	5,820	7,172	8,356	9,400	10,653
Total Electricity (MWH)	20,762	44,966	76,554	95,260	113,964	142,357	168,133	185,170	190,391	196,656

Table 16: Estimated Carbon Emissions Reductions from Project

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Marginal emissions factor*	0.485	0.425	0.452	0.478	0.489	0.505	0.525	0.513	0.521	0.521	
Rate of penetration--ESCOs	15%	30%	60%	70%	80%	90%	95%	100%	100%	100%	
Rate of penetration--Labels	10%	20%	30%	40%	50%	70%	90%	100%	100%	100%	
FO in industry	9,474	18,948	37,895	44,211	50,527	56,843	60,001	63,158	63,158	63,158	25%
NG in industry	2,068	4,135	8,270	9,649	11,027	12,405	13,094	13,784	13,784	13,784	6%
NG in commercial	514	1,028	1,542	2,056	2,570	3,598	4,626	5,140	5,140	5,140	
Cogeneration in industry	9,572	19,144	38,287	44,669	51,050	57,431	60,622	63,812	63,812	63,812	26%
Electricity in industry	4,686	8,213	17,469	19,163	23,292	27,711	29,924	32,530	33,818	33,045	13%
Electricity from industrial motors	2,095	3,672	5,858	8,260	10,562	15,271	20,412	22,162	22,507	22,507	
Electricity in residential	1,477	3,173	4,961	6,924	8,800	12,113	15,864	17,621	18,983	20,289	8%
Electricity in commercial	1,501	3,216	5,029	7,020	8,923	12,291	16,102	17,879	19,245	20,551	8%
Electricity in government	311	837	1,285	1,776	2,244	2,939	3,765	4,287	4,897	5,550	2%
Total reductions	31,697	62,365	120,597	143,728	168,995	200,602	224,409	240,371	245,345	247,837	100%
Estimated	31,697	62,365	120,597	143,728	143,728	143,728	143,728	143,728	143,728	143,728	1,220,756

End notes:

1 COPANT's working group on energy efficiency standards and labels has convened to takes steps to create a timeframe for compiling country information on energy efficiency standards and labeling programs and to move forward on a regional harmonization proposal. The Committee, headed by a representative of the Brazilian Standards Organization (ABINEE) is currently proposing to harmonize the comparison/categorical label, which resembles the European Union, Brazilian, Argentinean and Colombian comparison label. The priority products under considerations for potential harmonization include refrigerators, vertical and horizontal freezers, and residential air conditioners.

2 See Part I for data. Relatively wet years include 1995, 1998 and 2001, while 1999 was a dry year.

3 Analysis based on data provided by UTE.

4 Interview with María Michelena Etcheverrito, Risk Manager, Banco Santader-Consumer Credit, December 13, 2002.