

# TEASER DOCUMENT

## Decentralized Infrastructure for Rural Transformation Program (“ERTIC”)

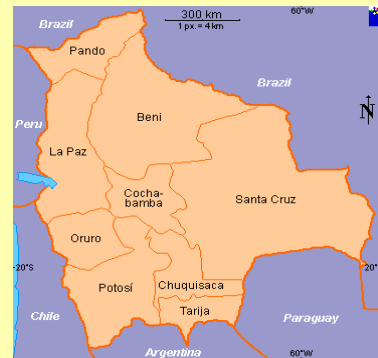
Summary: ERTIC Phase one and its solar PV Market Development Program

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**República de Bolivia**  
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## I. INTRODUCTION

**I**n Bolivia, a ten year, three-phase adaptable program credit financed by IDA/World Bank and starting in late 2003 will increase access in rural areas to electricity, information and communications services, by using innovative, decentralized public-private business models and focusing on productive uses and training of suppliers and users (Decentralized Energy for Rural Transformation Program – “ERTIC”).

As part of this program, output-based subsidies for innovative ‘Medium-Term Service Contracts’ aimed at local Solar Home System (SHS) market development will be competitively awarded in several tenders. Extending cellular phone coverage, TV and radio to rural areas will increase the demand for SHS.

The PV component of this program aims at servicing up to 15,000 new users via SHS (in addition to schools, clinics and other social uses) during the initial Phase One (four years). A successful implementation of Phase One will trigger the subsequent Phases Two and Three of the overall Program, each Phase with comparable PV installation targets.

### **Program Description: ERTIC**

The purpose of the Bolivia ERTIC Program is to expand and improve the delivery of infrastructure services through private-sector led mechanisms as a catalyst for the development of rural areas in Bolivia, with a focus on decentralized electricity services and information and communication technologies (ICT).

Since the ultimate development impact of infrastructure services depends on the extent to which they can be harnessed for productive and social uses, the program will include investments in both infrastructure ‘hardware’ and

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complementary ‘software’, such as training and applications. For both the electricity and ICT sectors, the GOB has developed expansion strategies, PLABER for electricity, and PRONTER for telecommunications.

In order to reach the development objective, the Program will concentrate on the following activities:

- (i) Increasing access to rural infrastructure services in the project areas by using innovative, output-based, decentralized service delivery models with increased private-sector participation and community involvement;
- (ii) Defining and implementing improvements in policy, regulatory, and institutional frameworks, and strengthening of the respective key institutions;
- (iii) Identification and development of applications for productive and social use of electricity and ICT;
- (iv) Intensive promotion, including market development and training of local users, service providers and authorities; and
- (v) Intensive monitoring and evaluation programs.

## **The Institutions Involved in the ERTIC Program**

The Bolivia ERTIC Program and the Medium Term Service Contracts are financed by the IDA of the World Bank. Locally, the program is technically coordinated by the Program Coordination Unit (UCP) of the Ministry of Electricity and Alternative Energies of the GOB. The World Bank has provided technical support, promoted capacity building and will coordinate the payments of output-based subsidies.

## **The “Medium Term Service Contract (MSC)” and the OBA Mechanism**

The basis for any successful OBA-based transaction is a careful design of subsidy allocation and service obligations enforcement mechanisms. This is of special importance for off-grid projects aimed at attracting private sector operators to remote rural markets.

The basic Program strategy is to stimulate the market by assuring the long-term availability of local support by developing selected local market areas via the so called “SHS Medium Term Service Contracts” (see below).

In some four (4) well defined areas (lots), “Medium-Term PV Service Contracts (MSC)” for 500 to 2,000 minimum users each would be bid out to private operators in Phase One. The SHS will be installed and serviced by qualified private sector operators, who would probably work via networks of

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local micro-enterprises installing systems, selling spare parts and appliances, implementing after sales O&M services, answering additional service calls, and developing their local markets via promotion and training.

Some of the basic guiding principles for this transaction design are:

- Service sustainability will be ensured by the MSC given that after the installation of the SFV equipment, the service providers will have to provide other services and activities for an additional period of 3 years.
- Therefore, the winning bidder will have the additional obligation to develop the local market in his respective area via capacity building (and M&E tasks) on the supply side (i.e. training local spare part and repairs specialists who will cater to the future spare parts market) and demand side (i.e. training users and promoting future sales of domestic, productive and public uses).
- Subsidies will be paid against outputs (i.e. users provided with satisfactory service plus local market development services successfully delivered).
- Qualified local and international private sector players will be invited to participate.
- To allow for cost reductions through creative business models by all bidders, but assure service quality over time, the bidding documents will aim at allowing for a “well informed freedom of choice” for service providers as well as users, by allowing for different ways of reaching the desired outputs, while fixing minimum service standards.
- Productive and public uses will be facilitated with special additional subsidies.

The MSC service obligation will set the local market development pattern via specific TA activities which will mostly be part of the winning bidder’s obligations:

- (i) households visits for checking the systems, training users and perform basic M&E tasks via simple questionnaires to be signed by the users;
- (ii) ongoing promotion of PV for domestic, productive and public uses in the service area; and
- (iii) establishment of a local micro-enterprise network that sell spare parts and repair systems. The M&E activities will allow close monitoring of compliance by the Project Coordination Unit (PCU) at low costs.

## **Main Differences Between the MSC and the Traditional ESCO Models**

It is important to notice that the SHS Medium-Term Service Contracts (MSC)

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is not an ESCO scheme since:

- (i) Operators are not forced to a fee-for-service scheme, they can sell cash or credit the system, whichever they (and each user) prefer, so that in many cases the user will own the system at the outset;
- (ii) However there is more attention to service sustainability than in a pure dealer model, by paying OBA subsidies to the dealer for building a local service and users' training network and establishing M&E systems;
- (iii) Users pay fully (and ad hoc) for replacements after a short initial guarantee period, so they will know and get used to what they will face in the future;
- (iv) After about 3 to 5 years, these local markets can "graduate" into free delivery and M&O commercial operations.

In other words, if one would aim at improving a pure dealer model (by adding mandatory O&M services of 2-5 years), or if one would aim at improving an exclusive concession scheme (by limiting obligations to 2-5 years and opening it to a choice of ownership/payment options), the MSC model is where both would meet. To bid areas and provide initial exclusivity for subsidy payments therein has the advantage that transaction costs can be kept controllable for all players, including government and auditors (this is key considering the extreme dispersion of population in rural Bolivia, below one household per km<sup>2</sup> in many areas).

## Previous Experiences with SHS in Bolivia

Roughly 20,000 equivalent SHS, or about 7% of the total national market, have been installed since 1992 (many through projects partially subsidized by donors or local authorities). Yearly installations have grown to about 3,000 SHS. While PV modules are imported, solar batteries of good quality are produced locally (about 2,500 solar batteries sold inside Bolivia per year, plus exports to Brazil), and several local companies are producing or assembling efficient light bulbs and charge controllers. The prevailing supply chain has three levels: (i) module providers; (ii) system integrators; (iii) installers/operators. There are more than ten qualified local system integrators today.

In the medium to long term, there are significant opportunities for cost reduction through increase in sales' volumes and establishment of commercial links with lower cost suppliers in the region and elsewhere (China, India, Indonesia, etc). In the short-term, assistance to the industry is needed to establish a rural sales-and-service network and to stimulate consumer demand by reducing unit prices. To that extent, the ERTIC program will involve subsidies that are justified on social equity grounds.



## II. PROGRAM OBJECTIVES

The Program will provide direct benefits to households and businesses in remote areas which would receive improved service (lighting and operation of small appliances such as cell phones, radio, TV, etc.) for small productive uses as well as for quality of life enhancement. Quality of life benefits of PV electrification include: (i) improved indoor air quality due to decreased use of traditional lightening fuels; (ii) higher quality lighting, facilitating reading, cottage industry, etc.; and (iii) improved safety through reduced potential of accidents like fires, etc.

There are also indirect benefits of improved service delivery (e.g. by health centers, schools, telecomm) to those too poor or otherwise unable to receive direct benefits. Indirect benefits also include increased economic activity in the electrified areas, leading to improved access to commercial services and increased employment opportunities.

The ERTIC program will provide subsidies to bring consumer payments for a significant segment of the market close to willingness to pay levels, as inferred from the current substitutable expenditures on traditional energy sources for lighting and basic communication.

### Introducing the Concept of Service

In the ERTIC program emphasis will be placed in a scheme oriented towards the “Service Offered” rather than in the traditional concept of PV dealer model. When focusing on the concept of “service provided,” attention is geared to what is really relevant; the product delivered. A general difficulty in service specification arises from tensions that exist between the need to lay down a precise description of the service to be provided by the successful

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supplier and the need to allow for flexibility and scope for innovation after the award of the OBA franchise. By focusing on desired “outputs” and not on the particular characteristics of the equipment supplier, a more flexible framework is provided leaving service providers as much freedom as possible for responding innovatively to customer demands. Providing this kind of flexibility is a program objective.

Program flexibility allows for PV equipment suppliers to, for example, join local micro-credit organizations, community organizations or NGOs in a partnership for providing the service under certain quality standards and conditions. These partnerships will be paid subsidies if they at least meet three basic objectives:

- (a) A portion (direct customer subsidies) is paid to the provider based on actual installations;
- (b) Another portion is paid against meeting performance targets related to service quality; training of local technicians; yearly visits; user training; M&E (as mentioned above); and
- (c) A third portion is paid based on meeting market development goals, such as creating a spare parts market.

As a “results oriented” program, the minimum characteristics of the “service to be delivered” will be defined in the bidding documents. That is why the bidding documents will specify a series of obligations that the winning bidder must comply with, such as:

- a) Number of users to be connected,
- b) The quality of service that must be achieved,
- c) Minimum conditions for managing and maintaining the service,
- d) Capacity building and training of local technicians and users in the management and maintenance of the service,
- e) Other obligations related to the development of the market and the creation of a sustainable service.

## **Flexibility for the Service Provider**

As mentioned above, the program is flexible enough to allow for the participation of organizations different to the traditional equipment suppliers. This flexibility also allows for partnerships among PV equipment suppliers, local micro-credit organizations, community organizations or NGOs as long as they comply with the pre-qualification criteria that will be defined in the bidding documents. Those that can show sound financial backing and an array of skills which appear likely to enable the firm to operate the franchise within the OBA contract specification, will be permitted to bid.



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Given that micro-credit services have been identified as a potential tool for expanding the number of potential users in the areas to be served, recommendations will be provided to bidders for offering different kinds of short and medium term financing to the users.

### **Program Goals**

The installation of 15,000 “equivalent Solar Home Systems” (for the purpose of this project, the PV systems to be installed in the target areas to serve productive uses will be counted as multiples of a standard SHS) are targeted by Phase One of the Solar PV Program (first four years). A successful implementation of Phase One will trigger the subsequent Phases Two and Three of the overall Program, each Phase with comparable PV installation targets.



### III. MECHANISM AND METHODOLOGY

#### The Tender Process

Local and international bidders will be invited in 2004 to bid for output-based subsidies in several predefined areas (lots). The bidding variable will be maximum number of SHS installed (in 3 years) and serviced over 3 years at a fixed total subsidy per area (i.e. the winning bid would result in the lowest subsidy per unit).

Subsidies would be paid against output upon initial business set-up, successful installation of SHS, satisfactory medium-term service (3 years for each user after installation), as well as specified local market development activities, such as promotion and training (see section 1.3). Each area (lot) would be assigned to its respective qualified winning bidder, and that bidder would have exclusive access to ERTIC PV subsidies during the period (a period of 6 years if the last installed panel was placed in year 3).

The winning bidders will be allowed to agree on a combination of payment options with their users, and therefore may chose to offer user finance as part of their service package. To this end, bidders will be allowed to form consortia of SHS providers/operators and microfinance institutions as mentioned in section 2.2.

Bidders will be allowed to apply for various areas, and to decide later for joint procurement of PV panels, to save through bulk purchase. Users and suppliers will be free to chose between all possible payment options (cash, micro-credit, finance), based on clear and simple standard contracts approved by the Project Coordination Unit. Users will be able to choose amongst a range of system sizes (probably 20 to 100 Wp). Technical Specifications for the SHS bidding documents have been prepared based on the current national Bolivian standard (NB1056), and have been updated (e.g. for direct capability with PV

GAP norms).

## **Disbursement of Subsidies**

The subsidies provided by the Project will facilitate an accelerated sustainable market development, allow a positive IRR for operators (in spite of the very low user density in rural Bolivia) and close the affordability gap between rural users' willingness to pay and SHS costs. The bidding documents will include tables with different payment options (upfront cash, differed payments, monthly payments), each of which will be related to the system size chosen by the customer and to his ability and willingness to pay.

As mentioned earlier the project will provide several types of subsidies:

- Direct up-front OBA customer subsidies on the initial investment cost, paid to the supplier on the basis of actual installations;
- OBA service quality subsidies, paid to supplier against installation and service performance targets;
- OBA market development service subsidies, paid to the supplier against training of local technicians, yearly visits, users training, etc.; and
- Indirect market development subsidies (aggressive overall promotion activities, support to the formulation of business development strategies, training and/or technical assistance).

It is important to notice that the planned payment of OBA subsidies over a medium term period would be against installation and basic service performance targets and would not cover replacement costs (which would not be subsidized in any way – except eventually for the replacement of the first battery). The same would apply to any irregular service visits “on demand” that the user might require (as long as they don't result from system failures under the operator's responsibility).



## IV. THE POTENTIAL MARKET AND DESCRIPTION OF THE AREAS

**T**he potential rural market for PV systems in Bolivia includes households, commercial and productive users (retail stores, rural restaurants, micro-enterprises, etc.), as well as institutional clients (schools, health centers, community centers, etc) in dispersed off-grid areas. Most household PV systems or Solar Home Systems (SHS) currently have 50 Wp solar panels that provide power for 4 low-wattage light bulbs 5 hours nightly, and for operating a radio or TV.

The total potential rural market has been estimated on the basis of a 2002 demand study (sample of more than 4,000 households, representative for both the national level and the Project's target area in its first Phase: – the full database as well as analysis of current substitutable energy expenditures will be provided as part of the data room during the bidding preparation process).

It has been estimated that about 700,000 households in the country are un-electrified and that 600,000 of these are in the rural areas. Assuming that about 50% of these households could be served by grid extension or mini-grid connections, about 300,000 households are left that could be categorized as “dispersed” (note that far more households in Bolivia are dispersed than in other countries, data on dispersion is available). Out of these, about 50% are currently paying at least 5 US\$ per month for energy expenditures that could be replaced by solar PV systems. This scenario represents about 150,000 households potentially able to afford PV service soon. Of these, about 40,000 households are in the three initial target zones of Phase One.

Additionally, a recent survey of non-electrified rural households in the ERTIC

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target regions shows that average energy expenditures (for kerosene lamps, candles, dry cells, etc.) are over US\$ 5 per month for 50% of the population, suggesting that this percentage of households could afford that amount for SHS or equivalent service. About 25% of the households currently spend over US\$ 8 per month on household energy, and about 10% pay more than US\$ 15.

This and other considerations led to the setting of about 15,000 “equivalent Solar Home Systems” as the Phase One target of the Solar PV Program. Particular attention will be paid to developing the productive uses’ sector for the obvious economic benefits electrification would bring. As mentioned earlier, a key driving factor for increasing the local demand for SHS in this project will probably be the rapid parallel implementation of the overall program’s ICT component in the same target areas, which will install TV, radio and cell phone repeater stations in order to cover most of the target areas with new signal.

### Brief Description of the Areas

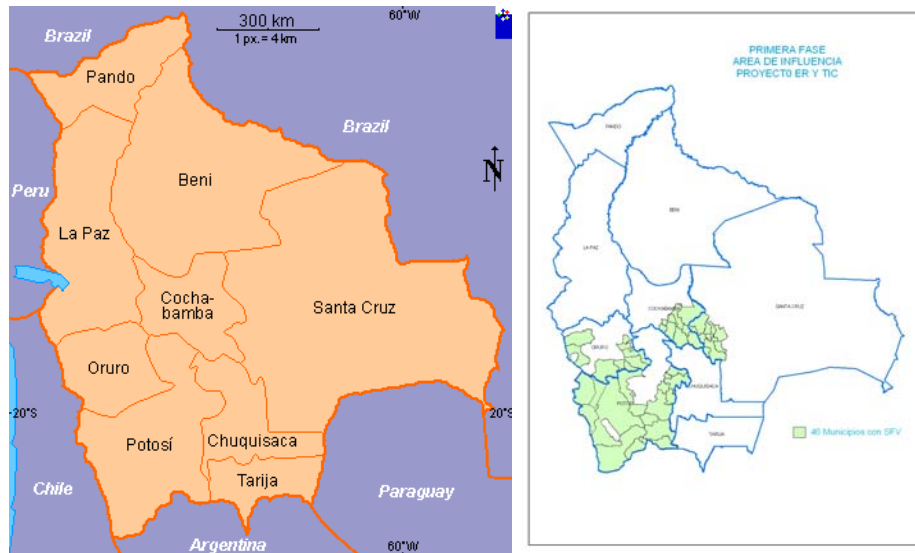
The project will take place in the rural areas of four different States of Bolivia: Oruro, Potosí, Cochabamba and Santa Cruz. The main characteristics of the areas are summarized in the Table below. Within these areas 81.969 households live in dispersed zones, while 71.310 of these households do not have access to electricity services. PV solutions are the most promising energy alternative for these households provided that they are disseminated in an area of 143.249 km<sup>2</sup>.

**Table 4.1. Main characteristics of the areas where the Project will take place**

AREAS	Area km <sup>2</sup>	Total rural popul.	Total rural HH	With Electric.	Without Electric.
<b>Oruro (Camélidos)</b>	23.208,3	47.894	14.189	1.111	13.078
<b>Potosí (Quinua)</b>	91.989,8	151.079	39.071	5.357	33.714
<b>Cochabamba (wheat, fruits, potatoes)</b>	14.218,3	82.504	19.719	2.692	17.027
<b>Santa Cruz (vegetables)</b>	13.833,0	35.569	8.990	1.499	7.491
<b>Total</b>	<b>143.249,3</b>	<b>317.046</b>	<b>81.969</b>	<b>10.659</b>	<b>71.310</b>

*Fuente: INE-Censo de Población y Vivienda 2001.*

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## **V. SCHEDULE, ACTIVITIES AND CONTACT INFORMATION**

**T**he Program has as objective to allocate the four areas to the winning bidders before the end of the current year. The schedule for the following months will be clearly explained in the information meetings that will take place with potential investors during the months of February and March. During these meetings, detailed information will be provided about the Program and about the key dates of the process related to the Data Room opening, sale of bidding documents, presentation of proposals, pre-selection criteria, and awarding procedures. Those that cannot attend the meetings but that are interested in the process, can get additional information by contacting the people listed at the end of this section.

### **Meetings with Potential Interested Investors**

Two meetings with potential interested investors will be held. The first will be in Frankfurt during the 23rd and 24th of February, 2004, and the second will be in Santa Cruz de la Sierra during the 2nd and 3rd of March, 2004.

During the meetings with potential interested investors, a full presentation of the Program will be made as well as of the basic structure of the tender process and tender documents. The aim of these meetings is to clarify doubts and answer questions related to the Program.

## ¿How to get additional information?

Additional information can be requested to the following people and institutions:

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