Financing Energy Efficiency Projects in Brazil

Report prepared for the Program "Developing Financial Intermediation Mechanisms for Energy Efficiency Projects in Brazil, India and China" with support from the World Bank, United Nations Foundation and the United Nations Environment Program

Authors:

Antonio Marcos Duarte Júnior[1]
Gerson Bronstein[2]
Luiz de Magalhães Ozorio[3]
Michel Wurman[4]

September, 2003

Ibmec Educacional S.A.
Av. Rio Branco , 108 – 19º andar, Centro
20.040-001, Rio de Janeiro – RJ – Brazil
tel: 55 21 3806 4021 / fax: 3806 4067
www.ibmecrj.br

This report has incorporated suggestions and comments from the following members of the Ibmec Group:
Alan Poole – Coordinator of Technical Group
Nelson Albuquerque – Responsible for the Secretariat
Nelson Pedrozo – General Coordinator

[1] Faculdades Ibmec, Rio de Janeiro. E-mail: aduarte@ibmecrj.br
[2] Ibmec Corporate, Rio de Janeiro, Brazil. E-mail: gbronstein@ibmecrj.br
[3] Ibmec Corporate, Rio de Janeiro, Brazil. E-mail: lmozorio@ibmecrj.br
[4] Banco Pactual S.A., Rio de Janeiro, Brazil.: mwurman@mls.com.br

Table of Contents

Ibmec Educacional S.A.
Av. Rio Branco, 108 – 19º andar Centro
20.040-001 Rio de Janeiro – RJ - Brasil
tel.: + 55 21 3806-4193 / fax.: 3806-4067

1. Introduction

This report has been prepared as a contribution to the Working Group on Financing Energy Efficiency. It summarizes preliminary work done in this initial phase of the project supported by the World Bank, United Nations Foundation and the United Nations Environmental Program – UNEP. It also outlines the work proposed for the next phase of the project.

The emphasis is on developing solutions for financing energy efficiency performance contracts, whose importance has been described in other papers and presentations for the Working Group.[9] There is, however, some consideration of the market for cogeneration/distributed generation, which is relevant to firms providing energy efficiency services – generally referred to as ESCOs.

There are important particularities in the Brazilian situation. It is hoped that some key characteristics will be made intelligible to an international audience. This is a necessary background for international exchanges regarding possible innovations – an integral part of the World Bank/UNF/UNEP project.

It is still early to propose definitive solutions. Rather, it is hoped that this paper summarizes key issues which must be addressed, the market context in Brazil for financing energy efficiency projects and the work that must be done in order to prepare concrete proposals.

2. The Brazilian Market for Energy Efficiency

The market for energy efficiency in Brazil has been developing gradually since the mid 90's. Although important, this segment has received so far little support from the Brazilian government concerning specific programs and policies.

[9] See presentations by Shirley Hansen at the Workshop on *Developing the Business of Performance Contracting* on the website: www.inee.org.br, as well as: T.H. Stoner & A.D. Poole; *Alternative Financing Models for Energy Efficiency Performance Contracting*; A Report to the Brazilian Energy Efficiency Financial Working Group and USAID/BCEEP; Econergy International and INEE, July, 2003.

In 1996, the energy efficiency market was estimated at R$ 14 million. In the beginning of 2001, on the eve of the electrical energy crisis, the Brazilian Association of ESCOs (ABESCO) estimated this market at R$ 60 million, approximately. By the end of 2002, the project flow was estimated at approximately R$ 80 million, signaling the importance of this growing market to the country. The average project is small (typically less then R$ 500 thousand) and has a short payback period (typically less then 1 year)

After the recent energy crisis, culminating in a long electricity rationing period, it was observed a growing interest in energy efficiency solutions. The members of ABESCO have experienced a large increase in the number of inquiries for such services. The end of the rationing period removed the urgency for energy efficiency projects, even though the possibility of reducing the subsidized prices for industrial consumers could put the pressure again.

In general, the main suppliers of such services are small and medium size companies, typically engineering firms. A few years ago it was believed that subsidiaries of utilities would play a major role in this market. However, very few utilities have established ESCO operations and these are timid – with the possible exception of CEMIG.

3. Market Potential for Energy Efficiency

The market potential for energy efficiency projects is certainly much larger than the current level of business. Unfortunately, there is little analysis available of this potential. Basic studies of energy use in different sectors have not been updated in more than a decade. Systematic analyses are planned by PROCEL (the government electricity conservation program), but will be restricted to electricity end-uses and are unlikely to be available soon. In the meantime, we must rely on smaller, more qualitative assessments

The main market segments of interest are the commercial and services sectors and industrial consumers with medium energy consumption.[10] Large energy consumers tend to have specialized energy management capacity in-house and also to have much lower energy prices – which reduces the attractiveness of projects. The target market segments represent a large share of energy consumption – in the case of electricity, about 40%.

ABESCO has estimated that the market for energy efficiency projects could reach R$ 1 billion (about US$ 350 million) per year within a few years. This value represents a kind of "theoretical potential" but is not unreasonable, especially if smaller scale cogeneration is included, if conditions, including the availability of financing, were favorable. With an annual growth rate of 50% it would take six years to reach this level, so this is unlikely to be a near term potential. Indeed, the lack of qualified engineers and other specialists could become a bottleneck in this scenario.

Perhaps more immediately important is that the existing market could double or triple in a short time. That is, it could quickly (say 2 years) reach a level of US$ 60-90 million per year - if mechanisms for third-party financing were available and standardized procedures were adopted in

[10] The scale of energy consumption may have little to do with the size of the company. Some medium energy consumers are very large companies.

the ESCO industry. This near-term potential should be sufficient to attract some local financial institutions interested in diversifying the risks in their energy portfolios.

The average project today is small (almost always less then R$ 500,000, the majority probably less than R$ 200,000, or US$ 70,000) and has a short simple payback period (usually less than 9 months). The very small size of projects and their short simple payback times are largely a consequence of the lack of commercial third-party financing.

The professionals involved with energy efficiency projects have long believed that the lack of financing mechanisms was one of the main barriers to the establishment of this industry in Brazil. The design of efficient guarantee mechanisms seems to be an important catalyst for the ESCO activity in the country. If financing were available there would not only be an increase in the number of projects, but in their size and in their simple payback times. How much the latter two increase will depend on the terms of the available financing? Initially, the increase may be small, as ESCOs and financiers get to know each other. However, soon after, the way should be open to go for larger projects with longer simple paybacks.

The first big market for this deepening of ESCO projects is likely to be building retrofits - which have been a key market for ESCOs in most countries. The energy uses are far more standardized than in industry and there are fewer issues about intervening in proprietary processes. This facilitates the use of instruments such as performance contracts, which are crucial to reduce the risks of third-party financial agents.[11] Brazil has a large stock of candidate buildings built more than 25 years ago that require retrofits of their basic utilities, including especially air conditioning.

While it is probable that simple paybacks times[12] would increase, it is unlikely that the maximum for ESCO electricity end-use projects will exceed 18-24 months. Also, while energy efficiency (EE) projects will grow in size, they will probably never be large. Even in North America, the homeland of modern EE performance contracting, the average project size is less than US$ 1 million.

At this point is well to remember that Brazilian ESCOs could also enter the market for small scale cogeneration – indeed some already have. Cogeneration projects are more capital intensive than typical ESCO projects and have longer simple paybacks. However, they bring strategic advantages for consumers concerned with the reliability of electricity supply in the coming years.[13]

4. The impact of energy pricing

There are serious distortions in Brazil's energy pricing today. The most important regard electricity. The average price of electricity to consumers has increased dramatically relative to

[11] Even in industry, the first projects may often be building retrofits, as a marketing strategy to gain the confidence of the client, before embarking on projects more intimately associated with the industrial process.

[12] The "simple payback time" of a project is the cost of the equipment purchased in relation to the projected resulting savings resulting from its purchase. It does not include "soft costs" such as engineering and financing. Typically a viable performance contract will need to be for roughly double the time for the "simple payback".

[13] See A.D. Poole; *Observations on the Potential for Cogeneration in Brazil*; report to the Energy Efficiency Financing Task Force, 2003. Available on the project website.

inflation since the beginning of the power sector reforms in 1995 (Figure 1). Even so, it is generally recognized that the average price must continue to increase. The policy of the Administration of Lula da Silva is to reduce the immediate increases, by among other things, creating a "pool" that mixes cheap "old energy" with more expensive "new energy". However, the clear tendency is for the average price to steadily increase over the coming years, compared with internal inflation.

At the same time, there are also distortions in the structure of regulated electricity prices. The two major distortions concern:

- **Voltage level at which the consumer is served** – The price for large high voltage consumers (especially above 139 kV) is much lower than for consumers in lower voltages. The difference is larger than justified by the real cost reductions of serving larger consumers at higher voltages.
- **Relative peak and off-peak electricity price** – The relative price for electricity during peak hours compared to off-peak use is much higher than justified by higher costs during peak hour. It varies from 5-10 times depending on the load profile and voltage at which the consumer is served.

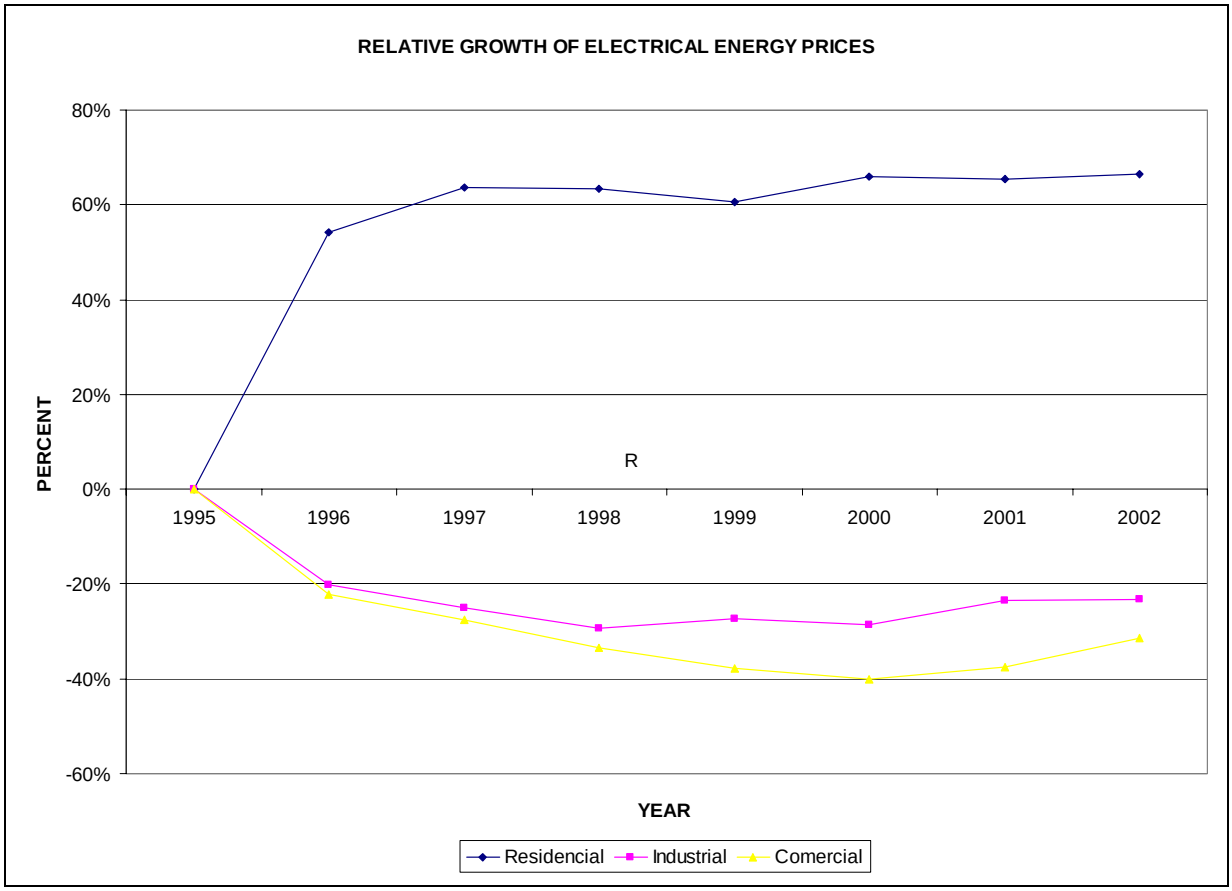


Figure 1 – Relative growth of electrical energy prices

These two distortions share in common the drastic devalorization of the cost of generation and associated transmission in an overwhelmingly hydroelectric system compared to the cost of

distribution. They both tend to inhibit investment in energy efficiency compared to other types of investment (for example, to be supplied at a higher voltage or to generate power during peak hours).

The cross-subsidy of large consumers makes them relatively unattractive for energy efficiency investments (or any other energy investments), as observed above. The declared policy of the government is to gradually reduce this subsidy.

However, even with the current price distortions, the market for energy efficiency projects could expand dramatically with adequate financial and contractual instruments. Prices for medium voltage and commercial low voltage consumers are relatively high and these consumers constitute a large part of electricity consumption. With the reduction of distortions and higher average prices, both likely, the potential market would increase. The question of electricity prices is discussed more in another paper prepared for this project.[14]

Natural gas prices are relatively high, especially for medium and smaller consumers. This has inhibited cogeneration based on natural gas, for which the ratio of electricity price to gas price is a crucial parameter. Increasing electricity prices and reducing structural distortions in the tariff would benefit cogeneration. It is currently unclear whether natural gas prices will come down.

5. Banking Environment in Brazil

Brazilian banks work in a unique environment, submitted to the Central Bank legislation. Volatility of local markets is known to be among the highest in emerging markets, the past experience with hyperinflation helped building a very defensive culture from financial institutions with respect to inflation, most foreign banks operating in Brazil during the last decade had to leave or substantially downsize because of local uncertainties etc. This takes us to what really matters when a company tries to finance itself in Brazil: it must face this environment, which is quite different from developed markets, and does not accept imported solutions, as many foreign banks have experienced.

The defensive culture which is now in place in Brazilian banks calls for high credit spreads (to defend themselves from rising inflation) and a large percentage of collateral required for most loans (to defend themselves from a rising probability of default; there is no official statistics on this subject published by the Brazilian Central Bank.) At this point in time, financing energy efficiency projects will have to compete with other options such as revolving credit, with annual interest rates of 175%, and the federal government financing itself above 20%.

As mentioned above, Brazilian commercial banks must comply with Central Bank legislation and cannot avoid this. There is, however, a small degree of liberty for banks to manage their loan portfolio, reflected in preferential rates for customers. The ESCO market is still unknown in Brazil, therefore the requirement for collaterals. Since ESCOs are essentially non-asset companies, it is unlikely that they be potential candidates for standard loan portfolio at commercial banks.

[14] A.D. Poole & E.T. Guimarães; *Steps Towards Building an Effective Energy Efficiency Strategy in Brazil*; A Report to the Brazilian Energy Efficiency Financial Working Group and USAID/BCEEP; INEE and the Cogeneration Forum, June, 2003.

The interest rates in Brazil, as in most countries, are set by the Central Bank in accordance with the monetary policy. Due to speculation regarding the recent presidential campaign, at the end of 2002, the Real significantly devaluated versus the US dollar, creating strong inflationary pressure. The inflation rate, as measured by IGPM (General Price Index), reached 25% by the end of 2002.

At the beginning of the new government in January 2002, a climate of political uncertainties persisted, causing further devaluation of the Real. Inflationary pressure continued and the Central Bank was forced to increase the base interest rate (SELIC) to 26% p.a. At present this rate is 22% p.a. Another important rate for the economy is the TJLP (Long Term Interest Rate) used by the BNDES (National Development Bank) as a reference base for credit lines offered. Figure 2 shows the evolution of the SELIC and the TJLP rates, as well as inflation index measured by the IGPM.

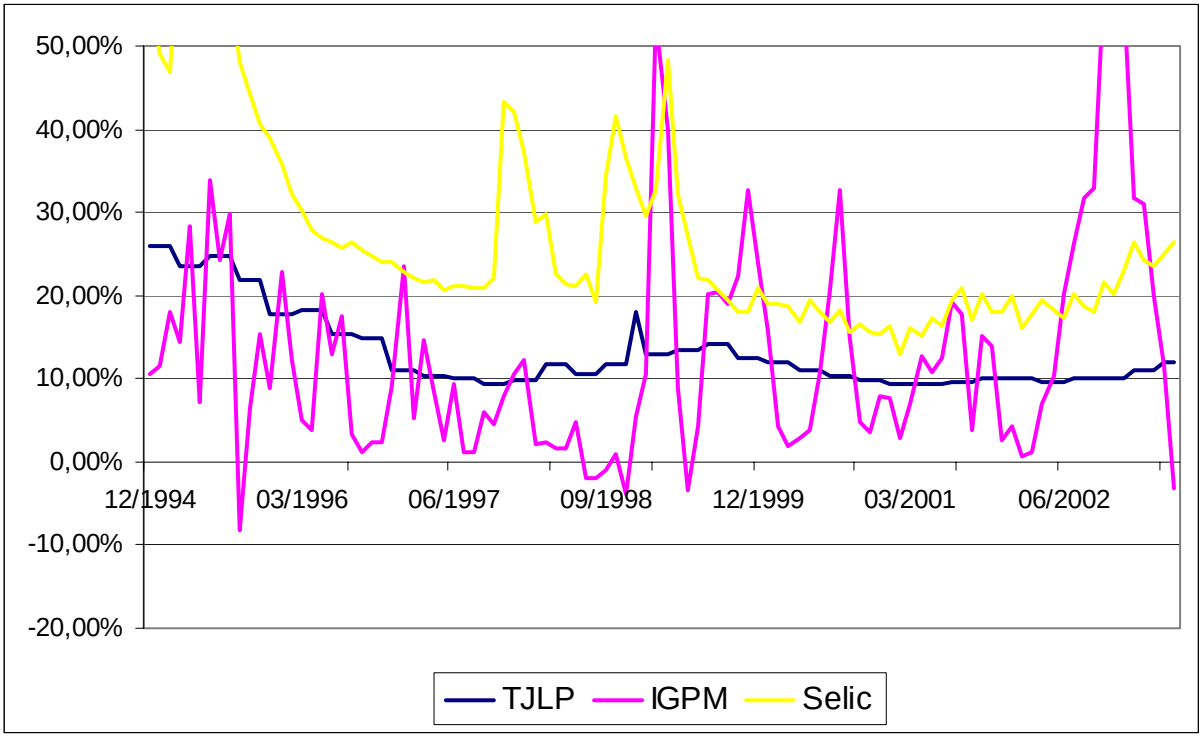


Figure 2 – TJLP, IGPM and Selic Indexes Evolution

6. Barriers to Financing Energy Efficiency Projects in Brazil

Today, one of the main barriers to the establishment of the energy efficiency industry in Brazil is the difficulty, by the ESCOs, to obtain funding to their projects. Among other factors, this difficulty is due mainly to:

i. **Low financial capacity of ESCOs –** The energy efficiency projects demand, in general, initial investments beyond those supported by ESCOs (typically small firms). In addition, contract characteristics assume long term payment flows.
ii. **Lack of understanding by financial institutions –** Due to the lack of understanding of this market and the contracting characteristics – performance contracts – the financial agents consider it a risky business. Also, these same agents have a high opportunity cost associated with other well-known products, such as revolving credits and consumer financing.
iii. **Lack of understanding by potential clients –** The same rationale occurs with potential clients. Due to the lack of understanding of this market and the contracting characteristics, these clients look carefully to these services.
iv. **Low priority associated to energy efficiency –** Even recognizing the benefits from energy efficiency, potential clients tend to consider them "low priority projects", either because they are strange to the company's core business, or because electrical energy represents a relative small expense.
v. **Lack of supporting collaterals by the ESCOs –** The financial agents, in general, demand collaterals as a guarantee for the funding. The ESCOs, small / medium size service companies in general, are most often unable to offer theses guarantees.
vi. **Shortage of specific financing funds –** Specific financing funds for emerging industries – venture capital – are scarce in Brazil. There are few other alternatives, which are inadequate (see next section for details).

The reasons presented above lead to a paradox: the financial agents resist financing such projects because they don't know the industry; the industry doesn't develop and become well-known because of the lack of funding. It is necessary to stop this vicious cycle by the introduction of mechanisms that offer a sufficient guarantee level to the financial agents, promoting a growing project flow and, as an immediate consequence, disseminating the concepts and benefits of energy efficiency.

7. The Brazillian Experience

Brazil has examples of guarantee mechanisms that were suggested as an alternative to support the energy efficiency activity. Two examples are: (a) Guarantee Fund for Competitivity Promotion (Fundo de Garantia para Promoção da Competitividade - FGPC) and (b) Guarantee Fund to Micro and Small Size Enterprises (Fundo de Aval às Microempresas e Empresas de Pequeno Porte - FAMPE).

Established in December 10, 1997, through the Act 9.531, the FGPC is a publicly sponsored fund managed by the Banco Nacional de Desenvolvimento Econômico e Social (BNDES) which guarantees, in part, the credit risk exposure of financial institutions to small and medium size businesses. The FGPC main characteristics are:

i. Covered guarantee: up to 80% of funding.
ii. Base interest rate: Taxa de juros de Longo prazo (TJLP).
iii. Guarantee cost: 0,15% per month over the covered guarantee.
iv. *Spreads*: 1% to BNDES and up to 4% to the financial agent

It is believed that the FGPC failed to act as an energy efficiency guarantee mechanism due to three main reasons:

i. Covered guarantee limited to 80%.
ii. Lack of collateral provided by the borrower.
iii. Difficulties in activating warranties in the case of default. GB irá modificar.

The FAMPE, which was created to improve the competitiveness of micro and small sized enterprises, shows similar deficiencies. The coverage is limited to 50% of the allowable credit (although the limit may be increased to 80% in the case of participation by another guarantee fund). The fund was not designed to finance energy efficiency projects.

8. Proposed Model

A generic model for development of the energy efficiency market is shown in Figure 3. There are two key factors in this model for it to become sustainable over the long term:

i. Technical guarantee.
ii. Financial guarantee.

The quality and consistency of the product shall be attested to by qualified professionals (Technical Consultants). In addition, to be eligible for the financing and guarantees, the ESCOs must also be certified. Here a relevant note: when we refer to certified ESCOs, we mean that the professionals responsible for elaborating and implementing the project must be certified.

The Guarantee Fund offers security to the commercial bank in exchange for loans granted. Based in previous sections, we believe that the guarantee should initially be 100%. One might think that in this way the banks might be indifferent in its selection criteria for ESCOs since 100% of the credit risk would be covered (moral hazard). However, we must take into consideration that in order to act as financing agent, the bank is subject to administrative costs to be covered by the spread of the loan. In the event of default, the Guarantee Fund would cover only the principal amount, not the interest (income) for the bank.

In addition, the role here is to be a primary source of funding for the projects. Initially these funds might come from BNDES or other development entity, although it is possible that the funds come from any source.

Together, these guarantees represent the main source of credit risk mitigation for the client and the financial agents. Although the model is conceptually adequate, the loan capacity for ESCOs is believed to run out quickly and since ESCOs depend on a flow of projects, and consequentially a flow of financing, this model does not seem adequate.

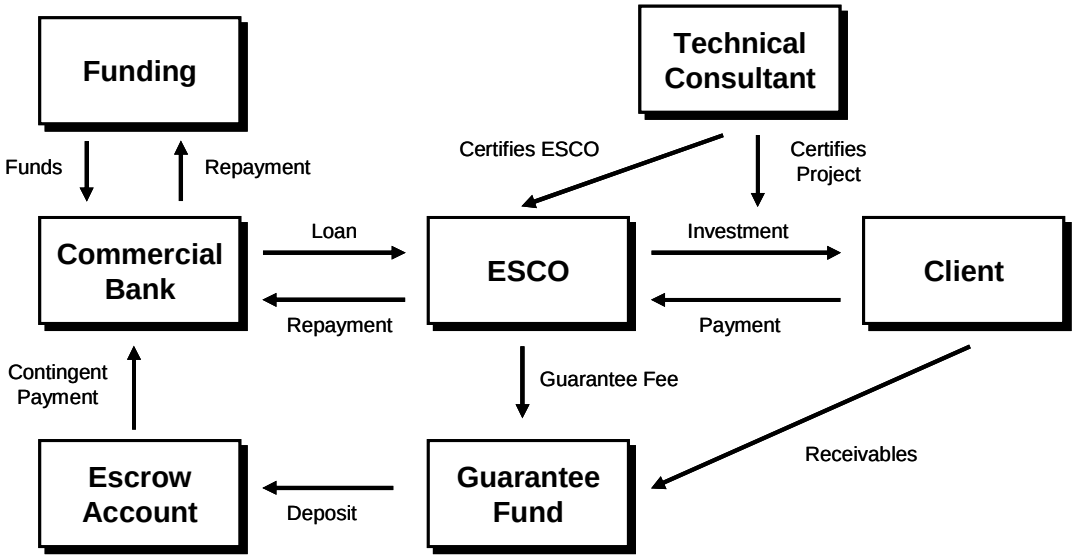


Figure 3 – Generic Model

Figure 4 represents an alternative model capable of solving, at least in part, the issue mentioned earlier. In this new model, two new players are added:

i. A Private Equity Fund.
ii. A Special Purpose Company (SPC).

A SPC would be created for each new project (or group of projects) with the main objective of separating the risks perceived related to the ESCO, and the project, permitting the financial agents to analyze the project risk separately.

There are still other possibilities in terms of setting up a model for financing energy efficiency projects in Brazil: the simplest case was given in Figure 3; the most sophisticated case was given in Figure 4.

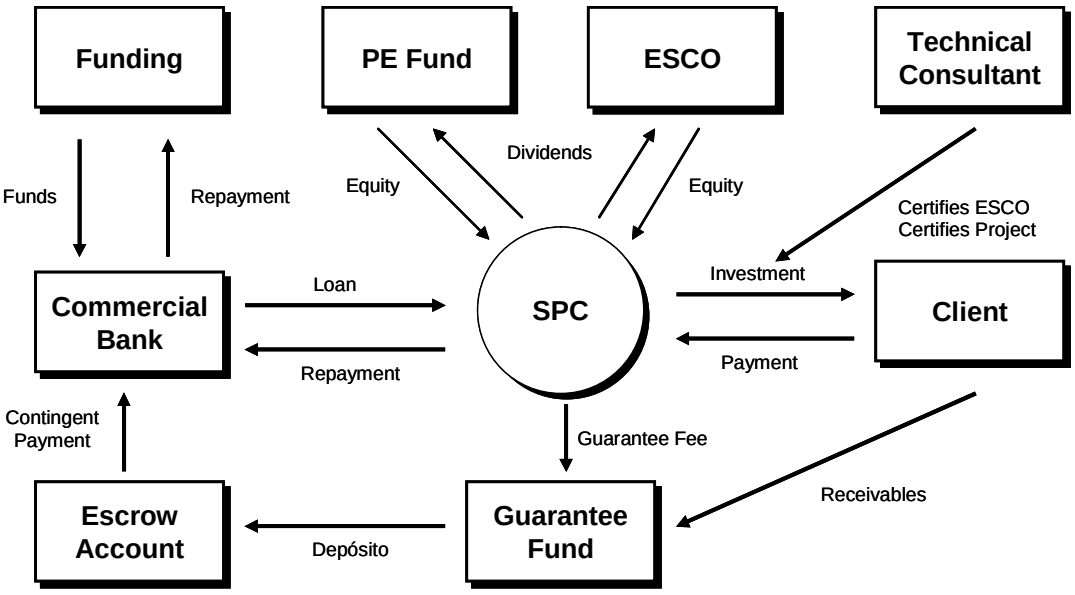


Figure 4 – More Sophisticated Model

With a SPC, the ESCO and project balance sheets are not related, in other words, there is no cross contamination. Therefore, from a lender's point of view (bank), the only thing that matters is the final customer's repayment capacity, as follows; the bank lends to the SPC which implements the project. The customer pays the SPC which in turns repays the bank. Since the SPC is just a contract, the repayment which interests the banks is that of the final customer.

Further, receivables from the final client may be used as collateral in the event of activating the Guarantee Fund. This is a way to assure (at least in part) recovery of the co-signing guarantee given. In the event of default with the SPC (and therefore disbursement by the guarantee fund), the guarantee funds may claim for collaterals.

Credit analysis in this case would mainly take into consideration the financial capacity of the end client and the technical quality of the project, instead of the financial capacity of the ESCO. It allows an operation on a larger scale by creating favorable preliminary conditions for market development. A Private Equity Fund, on the other hand, could access a portfolio of opportunities with relatively low operational risk when compared to typical projects, at an attractive rate of return. In this case the Technical Guarantee is of fundamental importance. The Financial Guarantee would be necessary initially to act as a catalyst until conditions permitting sustainable development are created. From this point on, this mechanism could be terminated. A brief description of the dynamics of the proposed model follows:

Agent	Investments / Payments	Revenue
PE Fund	Equity stake in each project	Receives SPC's cash flows after debt service
ESCO	Equity stake in each project	Receives SPC's cash flows after debt service
SPC	Project funding Pay fee to Guarantee Fund	Receives payments from client depending on the economy obtained (shared savings)
Commercial Bank	Provides loan to SPC	Receives payment from SPC In the event of default from client or project failure, receives payment from Guarantee Fund
Guarantee Fund	Pay Commercial Bank (in the case of SPC default project failure)	Receives fee
Client	Pay to SPC depending on the economy obtained	Savings in energy costs caused by SPC
Funding	Make specific financial arrangements available to Commercial Banks	Receives payments from Commercial Bank

This model, as any other, presents advantages and disadvantages as listed below:

i. Advantages

- Allows a higher leverage for ESCOs.
- Lowers the financing amount for commercial banks.
- Lowers the funding need for the Guarantee Fund (the PE Fund and the ESCO have equity in the project).
- Higher transparency – decouples project risk from ESCO risk

ii. Disadvantages

- Higher complexity – start up and management of several SPCs.
- Higher managing costs.
- Potential for governance problems – several shareholders in the SPC.
- For ESCOs – PE Funds are an expensive source of funds

It is our opinion that the advantages and disadvantages listed above need to be considered in order to reach the best possible solution. This is part of our future work. These advantages and disadvantages need to be balanced one against the other carefully. For instance, although it may be tempting for those unfamiliar with the Brazilian economic and legal environment to point out that the disadvantages above may outweigh the advantages, this question will be analyzed carefully before a final proposal is offered to the Brazilian society.

For the purpose of illustration, perhaps the main advantage is the possibility for commercial banks to enter the energy efficiency market. Normally a bank would not finance an unknown customer (ESCO), in an unknown market (Energy Efficiency), based on an unknown contract (Performance Contract), with an absence of guarantee (after all, an ESCO in general is a non-asset company). A SPC allows the bank to visualize the project risk through itself, since the risk evaluation now focuses on the end customer, generally with a much more "attractive" balance sheet.

9. Next Steps and Work Philosophy

It is crucial for the development of the ESCO industry that there be greater access to both credit and "equity" (less risk adverse capital) from third parties. In the second phase of this project, both will be addressed.

With regard to commercial bank credit, the primary emphasis is on developing a Guarantee Fund. While in principle a GF could be a private insurance service, in practice it is likely to require government support to become viable. The concept has been accepted theoretically by the government, but it has not evolved so far towards actual implementation. In the second Phase of this project, simulations will be made to help establish the criteria for a GF.

Unfortunately, depending on government action is very risky. Therefore much emphasis has been placed on developing channels for venture capital/private equity investment. This is an approach which has so far been largely neglected. If greater third party equity can be brought to the ESCO industry, this may improve access to credit, with or without a Guarantee Fund (though

there can be no doubt that a Guarantee Fund would enhance the growth of the market in the coming years).

A critical point to be considered for successful implementation of the proposed model is the correct sizing of the guarantee fund. It is believed that initially a mechanism is required to guarantee 100% of the loans made, since the risks involved are not yet understood by the financial agents. This task is made even more difficult since there are few local success cases for comparison. The major steps to follow in the next phase of work are listed below:

i. Completing the team with academic resources (post graduate students and professors).
ii. Further understanding of solutions adopted in other countries, i.e., an international experience that can be adapted to our reality.
iii. Determining the parameters and key variables for the model - an initial set of parameters and key variables is shown below; this list may change as the project develops.

Parameters	Key variables
• Economy interest rate • Funding interest rate • Project average size (in R$) • Project average life • % of expected savings • Preliminary design of performance contract • Average default rate • Credit recovery rate	• Size of Guarantee Fund (in R$) • Guarantee fee • Performance fee • Life of Guarantee Fund • Guarantee coverage • Capital structure of SPC • Equity structure of SPC • Operating Costs

iv. Model simulation.
v. Open discussion of results obtained

10. Funding ESCO Projects via Venture Capital/Private Equity Funds (VC/PE)

The following subjects will divide the study (detailed later):

i. Overview of Brazilian energy market.
ii. Assessment of Brazilian private equity market.
iii. Regulatory Issues.
iv. Structuring VC/PE products.
v. Funding opportunities.
vi. Valuation models.
vii. Identifying potential investors.
viii. Identifying potential managers.
ix. Conclusion

One important achievement will be the understanding of whether the use of ESCO operations is feasible for VC/PE funds. In order to do so, real-life implementations of other sorts of Brazilian private equity funds will be compared and a deep discussion of Brazilian current private equity laws will be realized.

Another important output of this study will be the creation of models that will simulate portfolio returns. If the returns generated by these models prove to be good enough for potential investors, a detail analysis of potential investors and managers will be included.

At the end, the group will provide results to help the World Bank stimulate potential investors to create private equity funds focused on investing in ESCO operations.

11. Overview of Brazilian Energy Market

The main objective will be the understanding of whether and where there are opportunities in the local energy market. It will build from preliminary analyses prepared in the first phase, summarized earlier in this paper.

It will seek to improve the understanding of the size and the ROI of typical projects, as well as the risks involved in projects of this type. The impact of the new model for the energy sector will be evaluated, including expectations regarding energy prices.

Brazilian current home energy prices are one of the highest in the world, while Brazilian current industry energy prices are one of the lowest in the world. Home prices subside industry prices. If this "unfair" situation persists, there will not be too much room for ESCO operations in Brazil since these operations are focused exactly on decreasing the cost of energy for industry firms.

However, most analysts believe that the new government will not allow that this situation persist for too long, which would generate huge opportunities for projects focused on decreasing industry energy costs in Brazil.

Moreover, the country suffered a shortage of energy in 2002, and there are speculations that this problem might happen again in 2006, or even in 2005, which would increase the Return on Investments (ROI) for energy efficiency investments.

12. Assessment of Brazilian VC/PE Market

The main objective will be the understanding of the current Brazilian VC/PE market. Although VC/PE market differs from country to country, there are special components that make this market particularly unique in Brazil.

In Brazil, VC/PE market growth was astonished from mid 90's to 2001, when a deep economic crisis put most of foreign direct investments on hold. However, given the optimism generated by the election of the new government, with a subsequent weakening of the exchange rate US dollars against Reais, more and more VC/PE firms have decided to resume their investments and are keen to analyze new opportunities.

VC/PE firms are eager to anticipate future market trends. That's the reason why IBMEC Valuation group believes that ESCO operations may be interesting for VC/PE firms.

The group will research the current number of investors, players and VC/PE market development trends to complement this part of the study.

13. Regulatory Issues

The group will study the impact of the "New CVM Regulation – Investing in Private Equity" in the development of this market. In addition, other important laws that cover VC/PE investments will be analyzed, such as CVM 209 and CVM 302 (CVM is the Brazilian security exchange commission).

The group will focus on verifying whether the Brazilian current laws, and the new ones that have been under consideration by CVM, are enough to protect potential investors against future litigations.

14. Structuring VC/PE Products

The objective will be the definition of the main parameters for creating VC/PE funds. These parameters will be the input required by the valuation part.

In order to analyze these parameters, the Valuation group will have to understand the main ESCO project variables. The group will examine various projects to forecast range for these parameters, such as:

i. Investment and Contract period.
ii. Hard costs: contingency on equipment, duties and taxes on equipment.
iii. Soft Costs: technical audit costs, engineering and construction management fee.
iv. Overhead: marketing fee, project management fee, legal costs, profit target for Special Purpose Company (SPC)

Moreover, the group will foresee the administration and performance costs for the fund.

The benefits of VC/PE funds will also be defined in this part: diversification benefits, leverage potential to debt funding, minimum level of performance, higher liquidness, efficient fiscal benefits and improvement of security markets.

15. Funding Opportunities

The group will take into account that most ESCO projects will need to fund their operations with a mix of equity and debt investments. These projects will certainly leverage their operations, which might improve the benefits for potential investors since it increases the ROI. However, if the levels of this leverage are too high, some investors may be blocked to invest in these projects because of contractual covenants.

This trade-off may generate an optimum level of leverage for ESCO operations that might interest most of investors.

In addition, there will be an analysis of the current funding lines available in Brazil such as: National Bank of Development (BNDES), FINEP, Banco do Brasil, International and National Banks.

16. Valuation Models

The objective is to create a model to analyze ESCO projects and calculate the ROI on each project.

The group will spend part of its time constructing this model because all parameters generated by the other parts of the study are basically inputs for this part. In order to guarantee that the model created generates correct outputs, some models created by other institutions will be compared to, and even used as benchmarking. For instance, some international consultants have offered some of their models to help developing a model for Brazilian needs. These offering will be our starting point, but will have to be adjusted to our local needs.

This model will not only generate the ROI for each project, but also the risk associated to each one. These two variables will be the basic input to create the portfolio.

Multiple combinations of portfolios can be created, but in this study only three portfolios will be analyzed: a low-risk, a medium-risk, and a high-risk.

The return for each portfolio may be the most important point to convince potential VC/PE funds to create a fund like this. The fact that these projects might generate benefits for the whole country - since they decrease the energy wastefulness - can be used to convince Brazilian government to create special credit lines for these portfolios.

17. Identifying Potential Investors

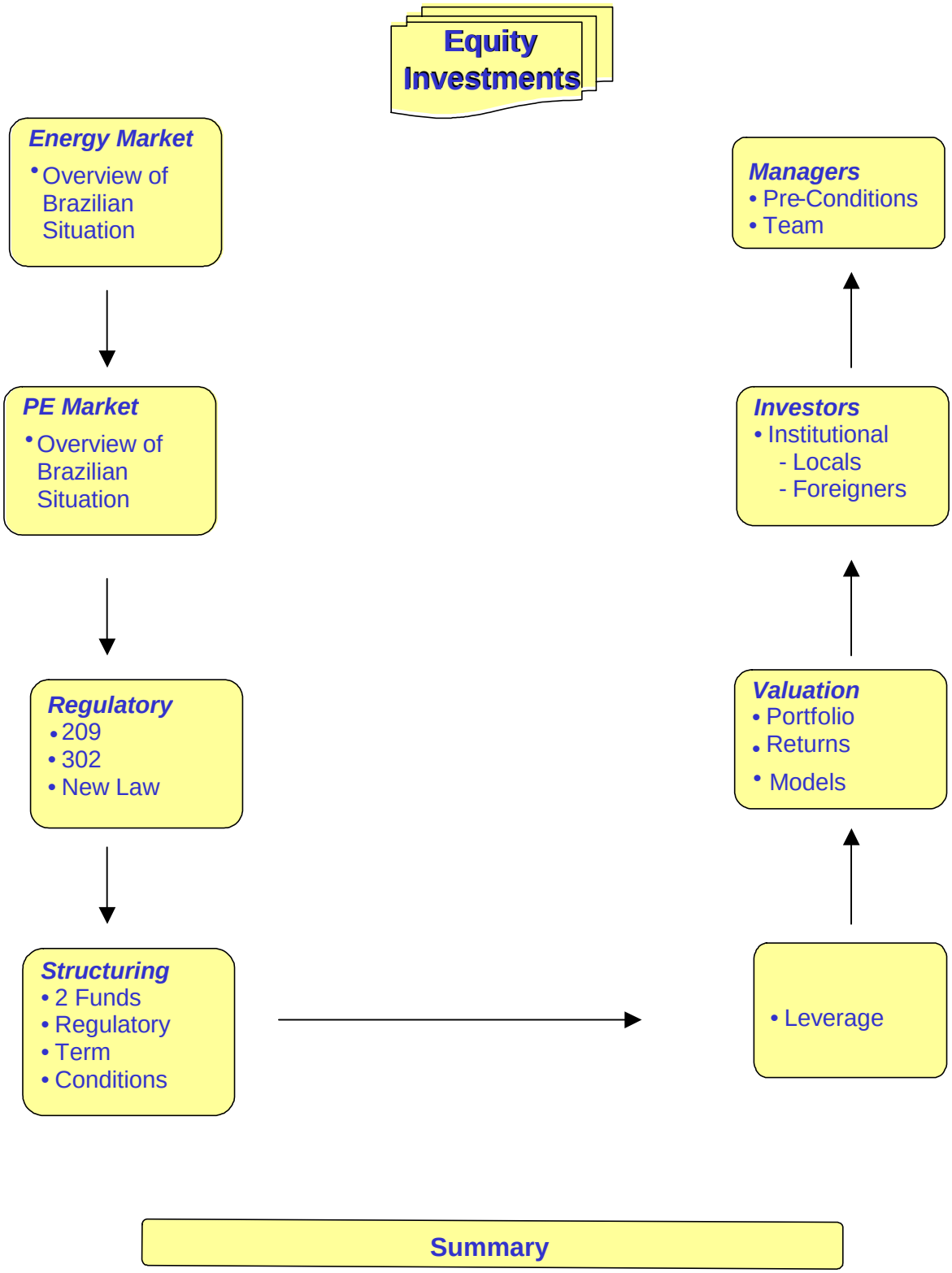
The group will investigate which investors might be interested in energy efficiency projects, and also which risks and expected returns potential investors would be looking for. We believe that Pension funds, IFC, BID, Brazilian national banks and international institutions are some of the potential clients for these funds.

18. Identifying Potential Managers

The group will depict the profile required to manage a fund as this one. For instance, a deep knowledge of how ESCO project works, and the benefits created by them, would be advisable. Other requirements may be found out during the research.

At the end, the group will summarize the research and stress the most important points. A “quick way” to create a VC/PE fund will also be illustrated.

Chart Summarizing Some Phases of the Study



19. Final Comments

As an educational and research institution, Ibmec has a role in developing awareness of energy efficiency in Brazil. The results obtained in this project will be publicized and made widely available in both academic and business environments. In addition to making the results public, programs focusing on developing technical and management/financial skills are also to be offered in order to increase awareness of energy efficiency as well as prepare professionals in the area. Performance contracts, energy efficiency project evaluation, identification and management of risks in energy efficiency projects are some of the issues to be covered.

In an effort to unite market professionals and academics regarding energy efficiency, the Ibmec Business School has recently promoted a series of seminars and will continue to do so. These seminars are open to the public and have been frequented by energy professionals from around the country. Master degree dissertations and undergraduate final term papers have been inspired by the seminars and are also available to the public. Subjects covered in the seminars include project simulation of a Guarantee Fund operation (including unusual scenarios covering stress testing of interest rate and exchange rates), mechanisms to evaluate ESCOs, subjects relative to the local energy market (as well as recent regulatory issues), risk management in energy projects in Brazil, and others.