

Removing barriers to financing **energy efficiency in Brazil:**

Financial and non-financial solutions for market agents



Credits

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The discussion on financing is of great relevance at both national and international levels to ensure a paradigm shift towards a low-carbon economy. However, the existence of resources alone is not enough. It is necessary to ensure full access to them.

It was with this assumption in mind that the CEBDS Energy and Climate Change (CTClima) and the Sustainable Finance (CTFin) Working Groups joined efforts to identify existing barriers and contribute towards increasing the access to existing credit lines for sustainability projects. Companies and financial institutions recognize the existence of barriers, on both sides, that hinder or even prevent the development of sustainability projects. In order to overcome this, it is important to translate sustainability into numbers and prove that businesses that are sustainable from an environmental and social point of view, have lower default risk and, therefore, should have access to lower interest rates.

CEBDS took the first step and chose energy efficiency projects. Although they bring positive results from the perspective of reducing greenhouse gas emissions and power consumption, the feasibility of these projects still faces difficulties, both within businesses and in financial institutions. For example,

within the company, these projects compete for investments priorities with other projects, without considering different aspects. In the financial institutions, we can mention lack of knowledge from commercial teams about energy efficiency.

In this study, we sought to identify the barriers that prevent or hinder access to the available resources and propose changes that can minimize these difficulties, both for companies and for financial institutions. The shift to a low-carbon economy is also needed from the economic viewpoint. Besides the increasing of new business activities, the green economy has items as energy efficiency and lower impact of natural resources consumption, work force qualifications and productivity, and also lower risks.

Its Worth to emphasizes that this is only the first of a series of studies that should be developed. We believe, with high confidence, that promoting the integration of different areas in the same company, as well as, different segments of the economic activity is an indispensable factor to surpass the barriers that hinder the way to enable financially the sustainability.

Marina Grossi
CEBDS President

What is CEBDS?

CEBDS is a non-profit organization that works with government and civil society to promote sustainable development in companies in Brazil, as well as to disseminate current information on business sustainability practices.

Founded in 1997 by a group of Brazilian business owners who were aware of the changes and opportunities presented by sustainability (especially after Rio 92) CEBDS convenes approximately 70 of Brazil's largest business groups. Together, these companies are responsible for around 40% of Brazil's GDP and more than one million jobs. CEBDS is the World Business Council for Sustainable Development (WBCSD)'s local chapter in Brazil, along with 60 national and regional councils spread out across 36 countries and 22 sectors, in addition to 200 member companies throughout the world.

CEBDS was the first institution in Brazil to address sustainability in terms of the Triple Bottom Line, an accounting fra-

mework that assesses social, environmental and financial performance. CEBDS is a leader in sustainability, and one that is focused beyond business, also reaching out to civil society and government partners. The organization is considered the main actor representing Brazil's business sector, and is recognized in leading a revolutionary alternative paradigm to the current economic model.

In 1997, CEBDS issued its first Sustainability Report for Brazil. In 2008, it partnered with the World Resources Institute and the Getúlio Vargas Foundation in the implementation of the GHG Protocol, aimed at measuring greenhouse gas emissions in the country. Since 1998, the organization has also represented its members in all meetings of the United Nations Framework Convention on Climate Change (UNFCCC), and in 2000 it began to do the same at the Convention on Biological Diversity (CBD).

Energy and Climate Change Working Group

The Energy and Climate Change Working Group consists of large Brazilian companies and it is proposed to address issues related to energy and climate change, as well as help businesses take advantage of new market opportunities and minimize their risks from the climate change. The CTClima also monitors and participates in the Conferences of the Parties of the United Nations Framework Convention on Climate Change (CoP) and forums of the Federal Government and civil society

Governance (2013 - 2015)

President: David Canassa (Votorantim Participações)

Vice-president: Vivian Macknight (Vale)

Coordinator: Raquel Souza (CEBDS)

Sustainable Financing Working Group

Officially launched in 2005, the Sustainable Financing Working Group gathers the largest financial institutions in Brazil and has already consolidated its position as a promotion source for a new development model, working with leading edge themes for the financial sector. CTFin helps encourage financial institutions to take on their role in promoting sustainable development, stimulating the discussion of principles and better practices, through projects and partnerships in the area of sustainable finance, that generate concrete results.

Governance (2013 – 2015)

President: Carlos Nomoto (Santander)

Vice-president: Maria Eugênia Sosa Taborda (Itau Unibanco)

Coordinator: Fernanda Gimenes (CEBDS)

A. Introduction



Investments in energy efficiency projects contribute to reducing greenhouse gas (GHG) emissions and energy consumption, as well as to national emissions reduction targets and saving financial resources in companies.

Despite the benefits of energy efficiency projects, their feasibility is still a challenge because of internal corporate issues and also issues related to financial institutions.

The project *Removing barriers to financing energy efficiency in Brazil: Financial and non-financial solutions for market agents* arose from the awareness of CEBDS and its members of the key role of the financial sector and companies in the development of an energy efficiency market in Brazil. In this study we sought to identify the obstacles that prevent or hinder the access of the corporate sector to the resources available for sustainability financing, with a focus on energy efficiency, and to propose changes that minimize these difficulties.

The methodological foundation of the study consisted of surveys and testing of hypotheses regarding the barriers to financing energy efficiency in Brazil. After understanding the most relevant barriers from literature review and analysis of economic-financial data, we conducted semi-structured interviews with officers from companies, financial institutions and associations connected to the issue. Lastly, we sought to understand international experiences before suggesting financial and non-financial instruments to overcome barriers.

Among the investment segments and options for energy efficiency, we opted to emphasize the barriers faced by the industrial sector and focused on equipment and process enhancement. Other actions such as distributed generation and cogeneration are cited in the paper, but they will be studied at greater depth in the future.



B. Background on energy efficiency

Brazil has several programs and initiatives to foster energy efficiency. The main ones are the National Electricity Conservation Program (PROCEL), the Brazilian Labeling Program (PBE), the Energy Efficiency Program for Distribution Companies (PEE - ANEEL), in addition to programs from the National Petroleum, Natural Gas and Biofuels Agency (ANP). Indus-

try associations and federations also have specific programs and/or projects, like, CNI and ABRACE.

A study carried out by the Carbon Trust identified in Brazil an availability of R\$ 400 million in credit lines and financial instruments exclusively for energy efficiency. Among the exclusive lines are ProESCO (BNDES) and the Pro-Hotéis program¹ and lines from development agencies such as the Green Economy Line from Desenvolve SP. If we consider non-exclusive lines, where resources can be raised for efficiency projects, the available amount is around R\$ 42 billion. Among non-exclusive resources are Finame and Fundo Clima (BNDES). Figure 1 contains a summary of the main exclusive and non-exclusive credit lines for energy efficiency in Brazil.

Figure 1 - Map of credit lines for energy efficiency

	Program		Scale R\$ MM ⁽³⁾	Focused on EE	Contracts	Scope	Interest Rates
BNDES	FINEM	PROESCO	62	Yes	Direct/Indirect	ESCOs, final users and distributing companies	5,1% + spread
		Industrial Production Capacity	200	No	Direct/Indirect	Industry	5,1% + spread
	Fundo Clima	Efficient transport	20 ²	Yes	Indirect via commercial banks	Transport	2,5% to 9,5%
		Efficient machines		Yes		Industry and trade	
	Others	Cartão BNDES	9.500	No		Any sector – SME	10,8%
		BNDES automático	9.400	No		Any sector	5,1% + spread
FINAME		23.400	No		Any sector	3,5%	
International Funds	IFC, BID...	EEGM, Pro-Hotéis	200	No	Indirect	Buildings	n.d.
Commercial FIs		Various	200	No	Direct	Any sector	7% to 20%
Regional agencies		Desenvolve SP	200	No	Direct	Any sector	n.d.
Energy distribution companies		Industrial Production Capacity	200	No	Direct (call for bids)	Industrial/ residential ⁽⁴⁾	n.d.

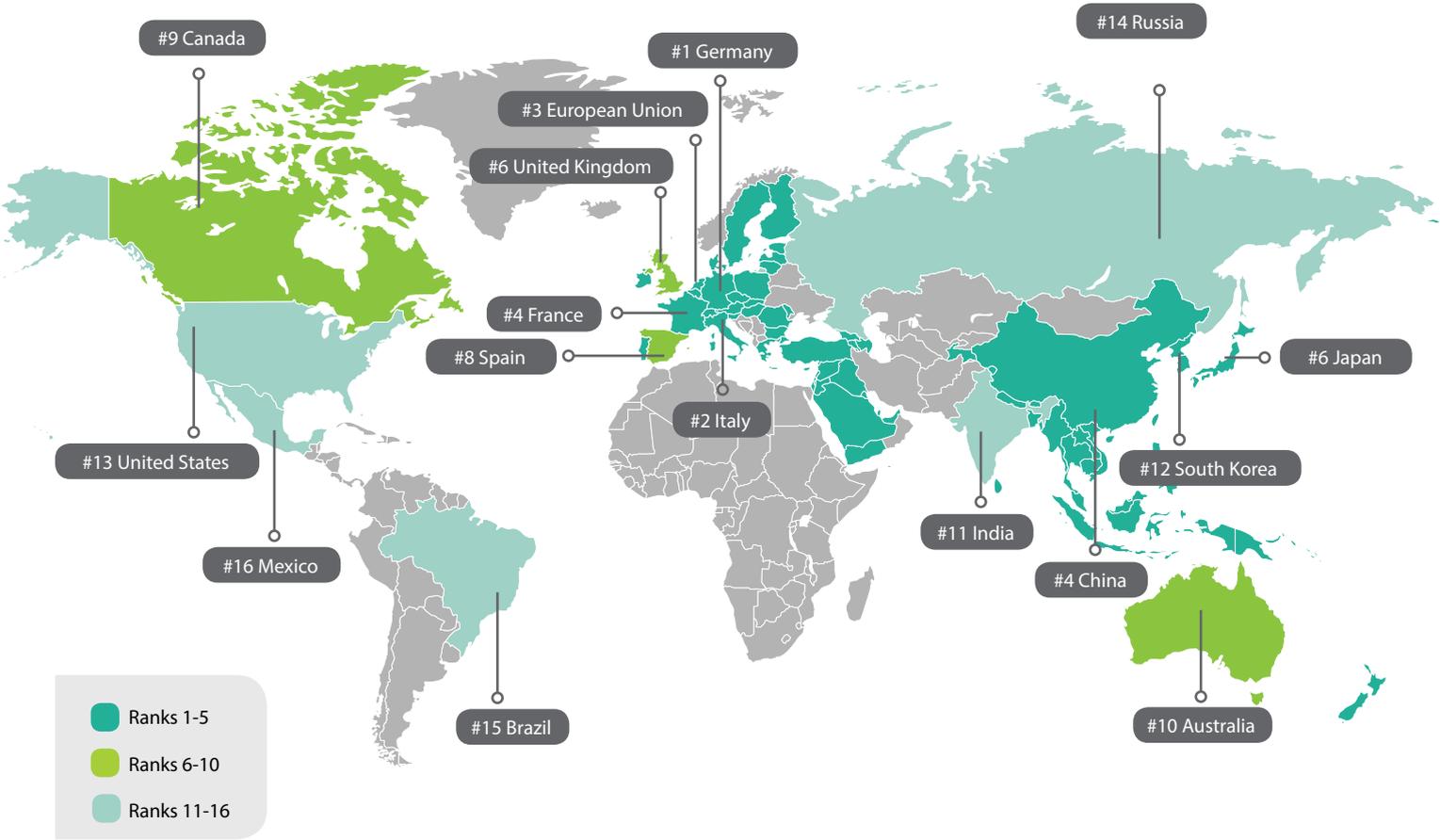
1) Amount reaches R\$ 42 billion if considered credit lines that don't have exclusive focus on energy efficiency 2) Average financed value for each project (2012) 4) Public call for projects focused on the two larger energy markets of each energy distributor (usually industrial and residential markets).

Source: Carbon Trust; CEBDS; SITAWI – Finanças do Bem

¹ Program geared towards energy efficiency in hotels, managed by Energia Eficiente with resources from IFC and Santander.

Despite a history of programs for fostering energy efficiency and the existence of specific credit lines, Brazil has low levels of energy efficiency when compared to the world's major economies. Studies carried out by the *American Council for an Energy-Efficient Economy (ACEEE)*² show that Brazil captures less than 30% of its energy efficiency potential and ranks 15th among the 16 analyzed economies. Figure 2 shows the analyzed countries and their position in the ranking.

Figure 2 - Scorecard of international energy efficiency³



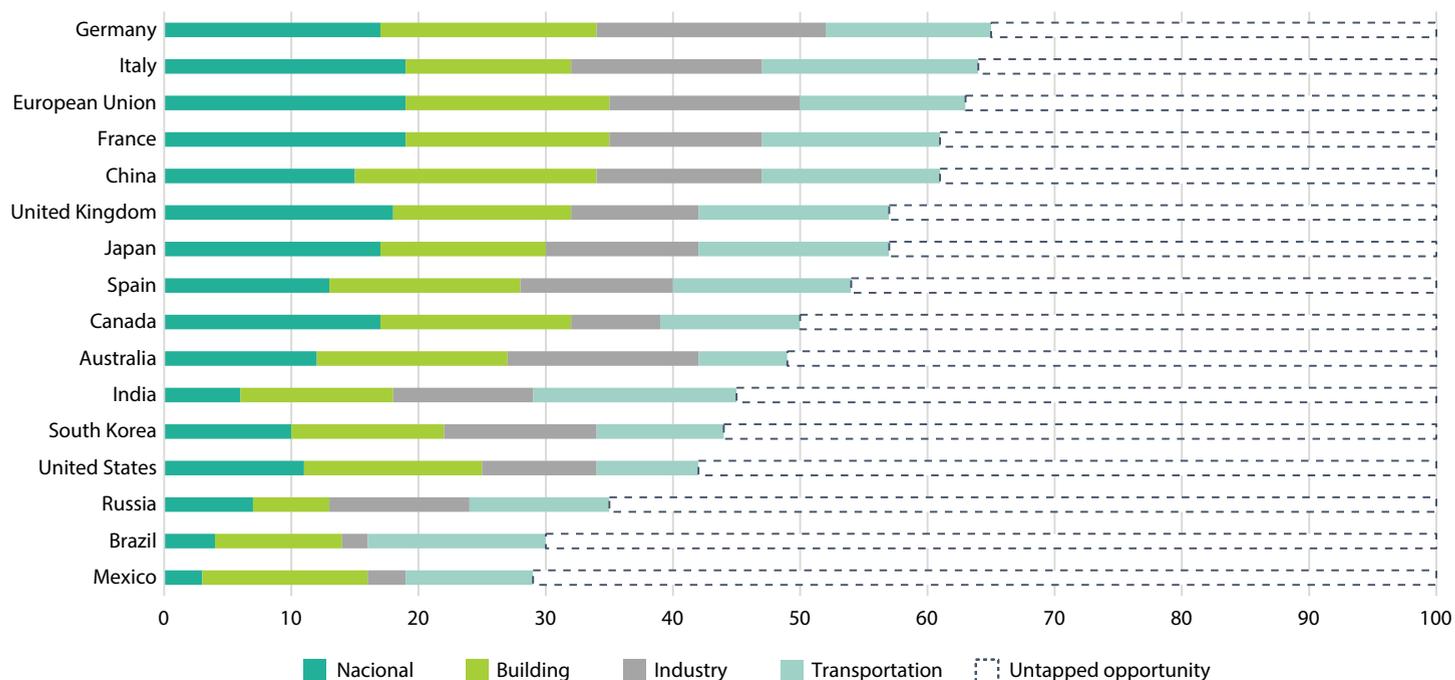
Source: ACEEE – Energy Efficiency Scorecard; CEBDS; SITAWI – Finanças do Bem

² O Non-governmental organization in the United States that fosters energy efficiency through studies, investment programs, political action and other mechanisms.

³ Source: American Council for an Energy-Efficiency Economy (ACEEE).

The breakdown of energy efficiency potential per segment illustrates the difference in the captured potential by countries such as Germany (63%) and Italy (62%) with respect to Brazil, as shown in figure 3.

Figure 3 - Points of countries per analyzed segment



This difference is mainly seen in national and industrial activities, according to the employed methodology. In the national segment, Brazil's points can be explained by the low investment in energy efficiency and efforts of national policies and programs to reduce energy intensity with regard to the GDP, in addition to the lack of a mature and dynamic energy efficiency market.

In the industrial segment, the difference in use is even greater. A study carried out by BNDES⁴ in partnership with COGEN and GESEL shows that the untapped potential of energy generation has reached 14 GW in 2011/12, in the sugar-ethanol industry alone. In a study developed by CNI⁵ with 13 industrial sectors, 82% of energy savings opportunities in industry are in thermal processes.

⁴ Determinants of the low use of the electric potential of the sugar-ethanol industry: field survey.

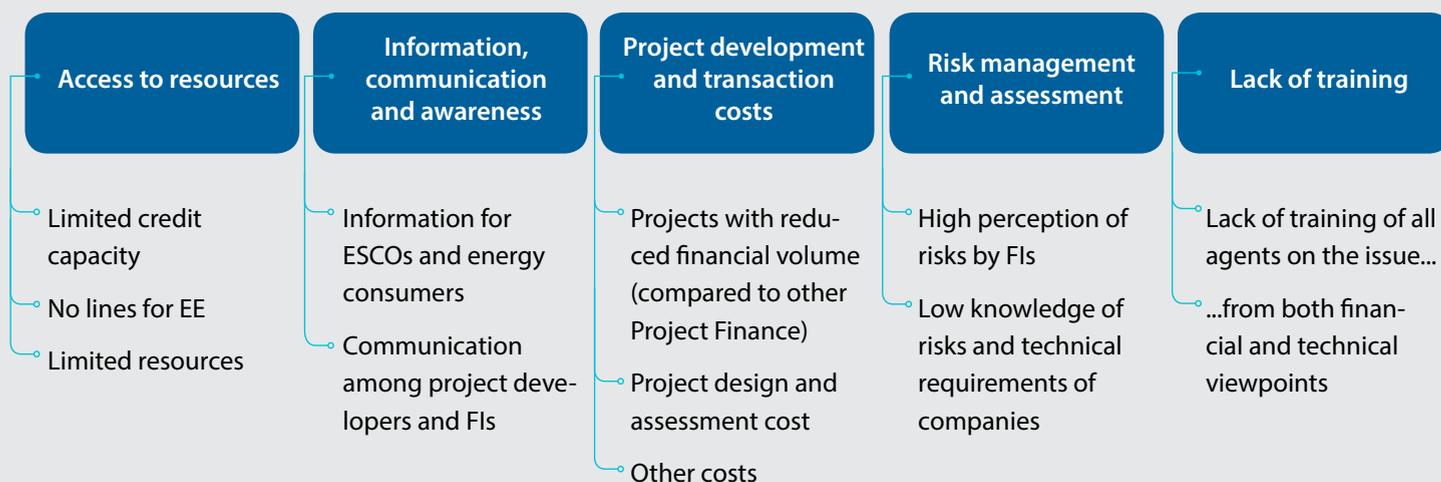
⁵ CNI: energy efficiency in industry (2009).



C. **Barriers to financing energy efficiency in Brazil**

The barriers to financing energy efficiency have been studied by several international institutions such as the International Energy Agency (IEA), the International Finance Corporation (IFC) and the Inter-American Development Bank (IDB), in addition to governments and national agencies such as the American ACEEE. Based on the examination of the state-of-the-art of these international studies, we identified five main barriers to financing energy efficiency.

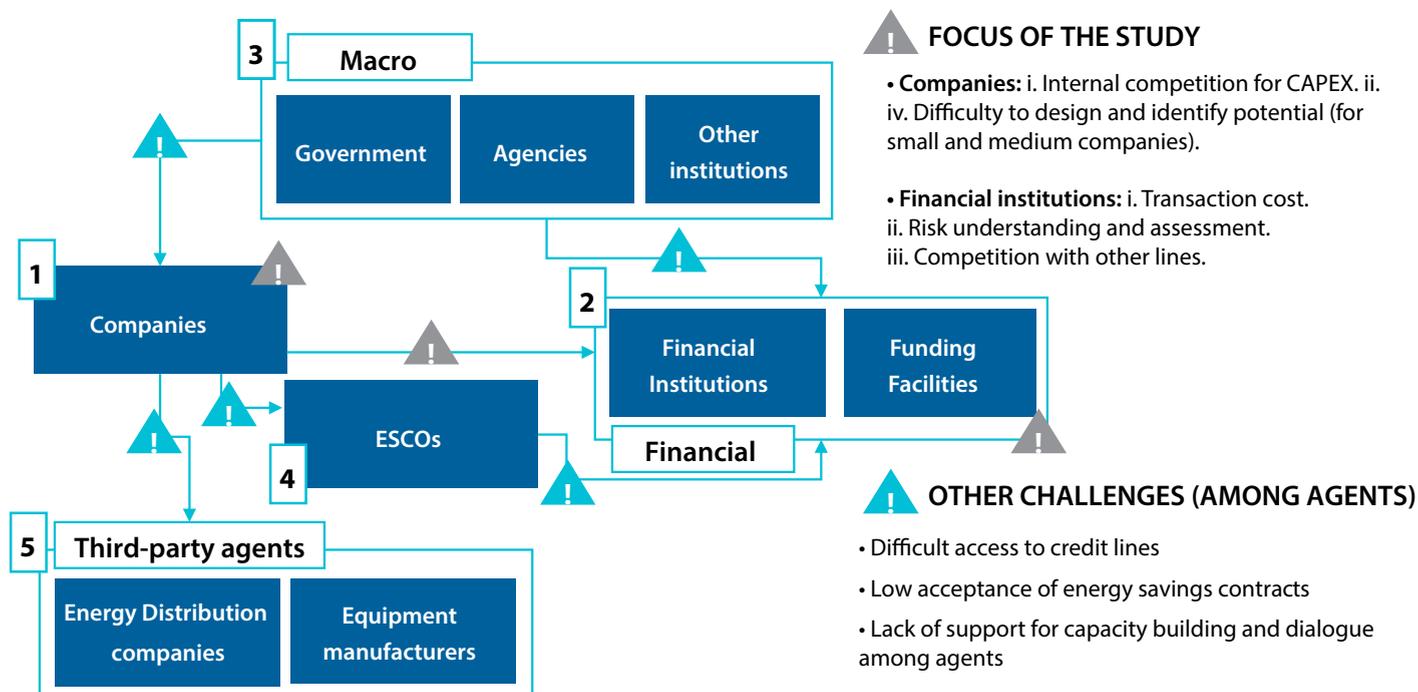
Figure 4 - Barriers to financing energy efficiency⁶



Although these barriers are also present in Brazil, it is necessary to achieve a better understanding of how agents of energy efficiency market act in the country. Specificities such as the degree of the maturity of the market and of the actors influence the impact and relevance of these barriers. Regulatory issues such as the power industry's remuneration model and the existence - or not - of targets for emissions reductions and/or energy efficiency also influence the comprehension of these barriers for Brazil.

⁶ Source: International Energy Agency

Figure 5 - Main challenges of the energy efficiency market⁷



Source: Desk research; Entrevistas; CEBDS; SITAWI – Finanças do Bem

Each of the agents in the above figure has a specific role in the energy efficiency market, such as:

- **Companies.** The project developers: when projects are not executed with their own capital, they seek funding through financial institutions (CAPEX) or ESCOs (OPEX). Ultimately, it is the companies that most benefit from the project because of the reduction in energy consumption and emissions as well as the financial gain resulting from these savings.
- **Financial institutions.** They finance or intermediate resources for the projects, they have their own specific requirements and also those from the funding facilities.

- **Macro agents.** Government institutions that have multiple roles that go from fostering and capacity building of companies to developing targets and supplying funds. They also strongly influence market dynamics and incentives, be it because of regulatory alterations in associated sectors, such as ANEEL and ANP,

⁷ Source: own preparation

or by setting energy efficiency or emissions targets for a certain sector or economic activity.

- **ESCOs.** Energy Service Companies are engineering companies specialized in promoting energy and water efficiency in their client's facilities, mainly through the use of performance contracts. They assist in the design and implementation of projects and are also an option for financing through performance contracts, sale of excess energy or purchasing energy.
- **Third-party agents.** The most significant third-party agents are energy distribution companies and suppliers of efficient equipment. Energy distribution companies must invest, at least, 0.5% of their net operating income in energy efficiency projects. The equipment suppliers provide products with better energy performance; they have in-depth knowledge of the available technologies and can identify improvement opportunities. They can also finance certain projects. In sum, these third-party agents provide technologies, expertise, and capacity building for projects and in some cases are funders.

The focus of this paper is the barriers that affect companies and financial institutions, but it is also possible to comment on some of the barriers that influence other agents like ESCOs and energy distribution companies.

i. Internal barriers of companies

Based on the diagnosis, we identified several internal barriers in companies to the development and financing of energy efficiency projects, including:

1. Competing with other projects for CAPEX
2. Insufficient knowledge of the benefits of energy efficiency
3. Low capacity to identify opportunities and implement the projects
4. Differing incentives among internal areas
5. Aversion to risks related to energy efficiency projects and investments

Competing for CAPEX

Among the barriers cited above, competing for CAPEX, that is, the capital budget for investment projects, is believed by the interviewed companies to be the most crucial one. Ultimately, even if the company has identified a potential for efficiency and is interested in developing the project, the limited capacity of raising funds invalidates the project. Thus, energy efficiency projects must compete with other core projects that, in general, provide higher economic return or greater alignment with the strategic interests (competitiveness, growth, entry into new markets) of the company.

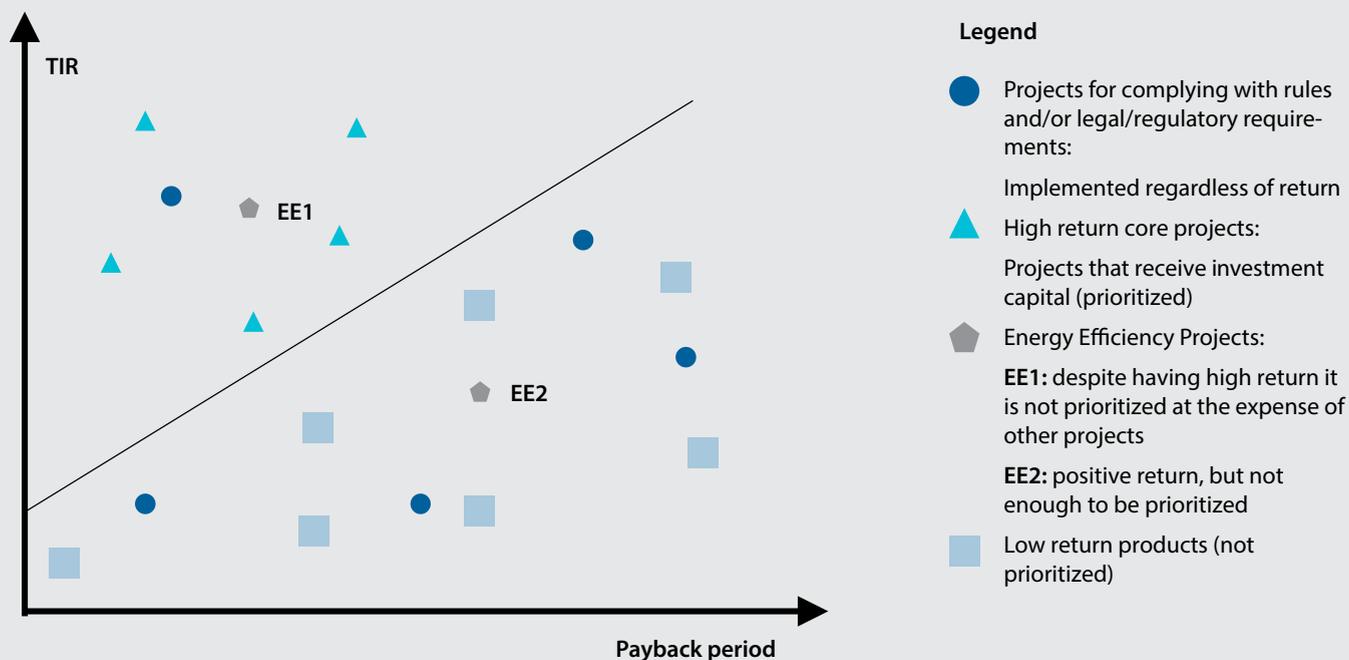
Furthermore, the competition for resources for energy efficiency projects is impacted by other factors such as the method of accounting used for the return of these projects. Usually, in calculating the return, only the resulting energy saving is counted. Externalities such as productivity gains, emissions reductions and cost reductions with equipment maintenance, common results of these projects, end up not being included in the balance sheets.

Likewise, the strategic focus of companies also has an impact on the competitiveness of these projects. Even if an energy efficiency project has the same return as other core projects, it is put aside. A common example is the having to choose between expansion of the productive capacity and eco-efficiency in general, including energy efficiency. Usually the first is prioritized at the expense of the latter, given the appeal of increased productive capacity and market gain that is intrinsic to the competitive strategy of companies. In addition, in some sectors, the energy input may not represent a significant cost factor. This is shown by the lack of eco-efficiency targets, particularly energy efficiency, in small and medium sized enterprises.

In sum, competition for CAPEX results in energy efficiency projects not even being submitted to financial institutions. This also occurs in cases where the capital cost of these projects is lower than other core projects or the average capital cost for the company, as in the case of financ-

ing via ProESCO. Figure 8 shows an illustration model of prioritizing among the projects in a company and two typical cases of how energy efficiency projects are passed over.

Figure 6 - Illustrative model of prioritizing projects



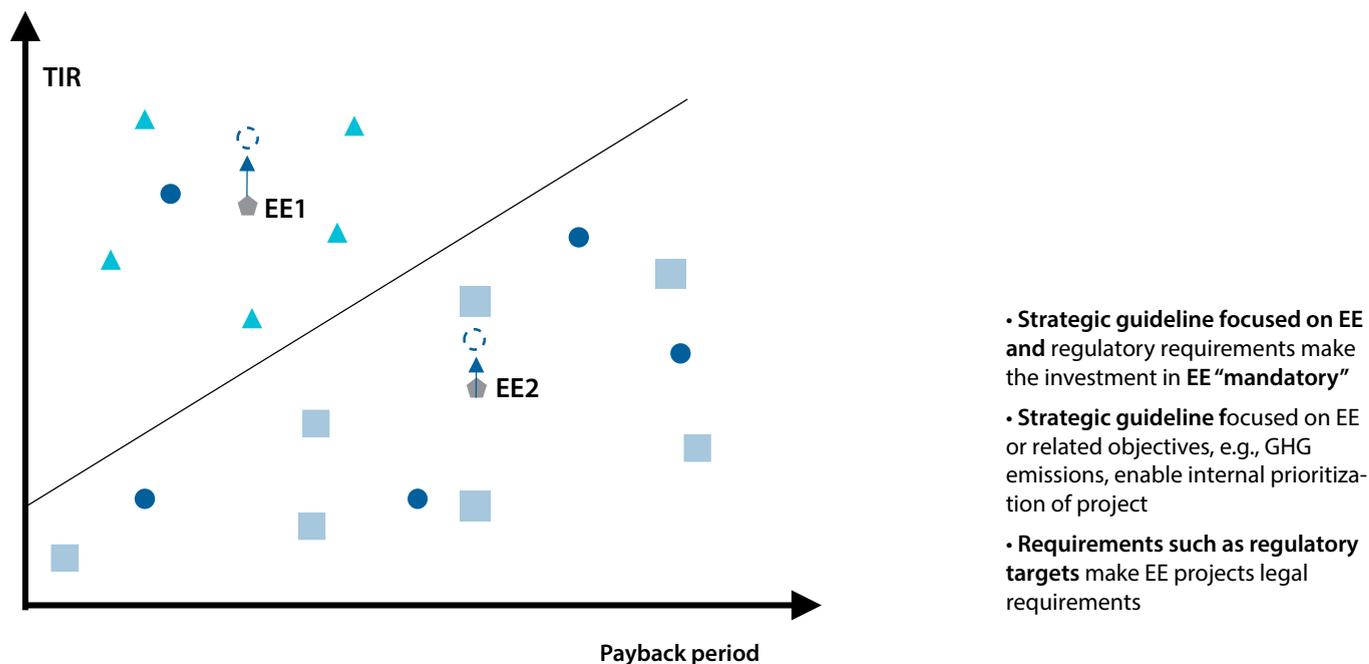
Source: Desk research; Entrevistas; CEBDS; SITAWI – Finanças do Bem

Among the instruments available to address these barriers are financial solutions that allow projects to be implemented without the need for CAPEX. These solutions go from performance contracts and energy sale/purchase contracts with ESCOs to off balance sheet loans through special purpose vehicles (SPVs). Other instruments are leasing and concessional finance such as FINEP research and development grants.

Another possible solution is the inclusion of energy efficiency or greenhouse gas emissions reduction in the strategic matrix of the company. Thus, energy efficiency projects will also be prioritized in resource distribution, as is the case of projects

that are implemented to meet regulations, shown in figure 9. Similarly, regulatory requirements and targets for energy efficiency lead companies to prioritize investments in this area.

Figure 7- Illustrative model of prioritizing through strategic guidelines



Source: Desk research; Entrevistas; CEBDS; SITAWI – Finanças do Bem

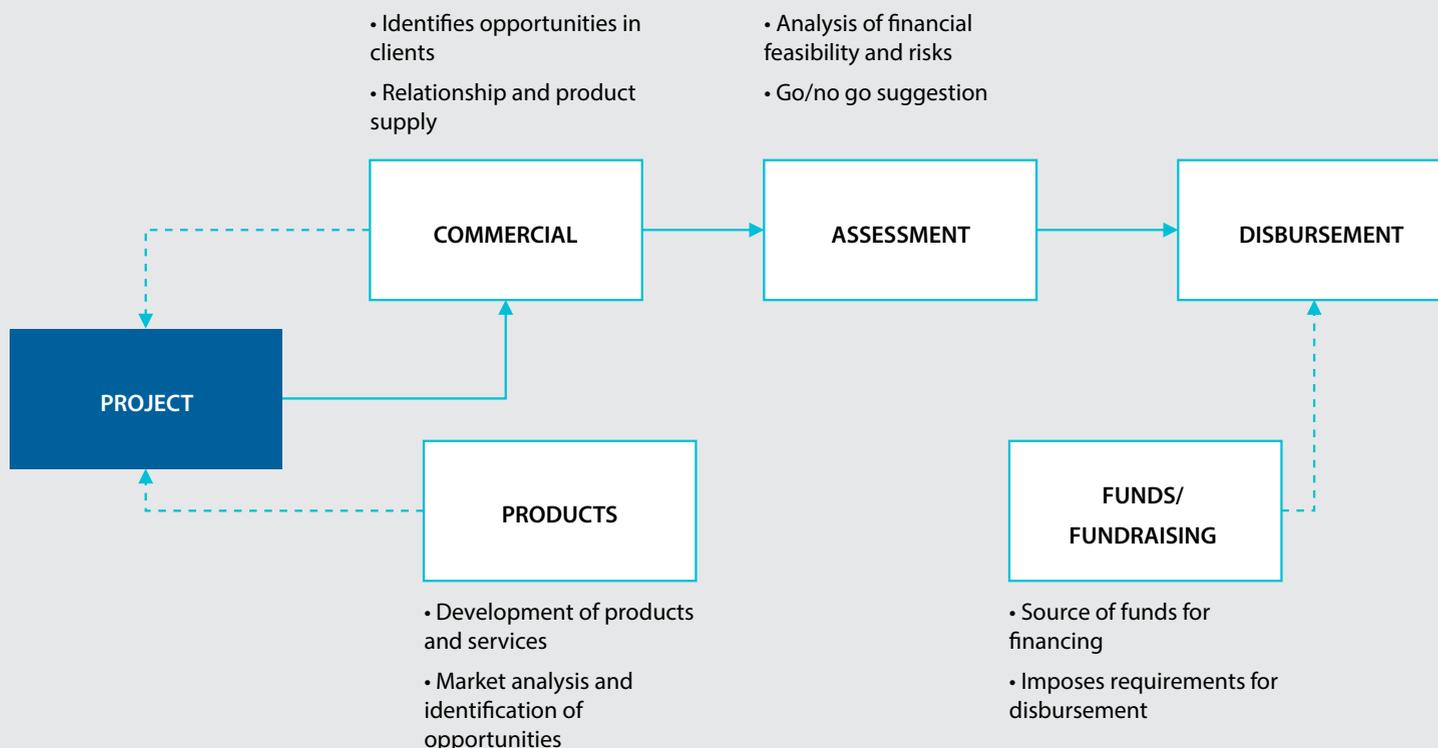
The inclusion of energy efficiency or emissions targets also eases the way for implementing other solutions. This is the case of quantifying externalities and their inclusion in prioritization models. In other words, the company is encouraged to include different prioritization models that take into account not only economic variables such as a matrix that compares GHG emissions with financial return of the project; or the development of a socioenvironmental rating for the projects, to be used as a guide for decision making.

ii. Internal barriers of financial institutions

We identified internal barriers of financial institutions (FIs) based on the analysis of the complete process of financing energy efficiency projects. That is, from

product development by the FI (or client demand) up to its disbursement, as shown in figure 10.

Figure 8 - Simplified flowchart of financing energy efficiency



We identified six main barriers:

1. High transaction cost for project assessment and financing, when compared to other FI products
2. High perception of project risks
3. Low incentive and/or knowledge of credit, products and commercial teams to address energy efficiency
4. "Aversion" to instruments and contract models (performance, guarantee)
5. Funding requirements make the loan unfeasible
6. Inexistence of instruments that increase the project's economic gains

Each of the barriers listed above has unique impacts on the financing of energy efficiency.

High transaction cost

The most significant of these barriers is the high cost of transaction existing in the financing of these projects in Brazil. This barrier has impacts throughout the process, from the identification of opportunities and development of specific lines and products through to risk assessment and fund disbursement.

Structured as *project finance*, requiring more in-depth technical analyses and specific expertise, energy efficiency projects end up competing with projects of much higher value. That is, energy efficiency projects with an average price tag of less than R\$ 10 million compete for attention, human and financial resources of financial institutions with large projects that can reach billions such as, for example, financing hydropower plants and wind farms. We can say that the high transaction cost of these projects is very similar to the competition for CAPEX in the case of companies. The low expectation with regard to returns of these projects discourages commercial teams in their assessment and recommendations of projects sent by companies even to study potential markets and to proactively supply credit lines for energy efficiency. Thus, instruments are required to decrease these transaction costs, that is, that make financing of energy efficiency a standardized and scalable transaction..

iii. Barriers that impact other market agents

a) ESCOS

Financing of energy efficiency through ESCOs encounters two main barriers:

1. Risks tied to performance contracts are not recognized or overvalued
2. Limited credit capacity to finance more than one project at a time

The first barrier occurs because financial institutions do not accept performance contracts as financial guarantees for funds disbursement. Therefore, ESCOs wind up at the second barrier, since they cannot finance the existing demand for projects because they do not have enough capital themselves and their balance sheets limit credit from third parties. This situation is even worse in the case of Brazil, where the ESCOs market is fragmented and mostly made up of small and medium sized enterprises.

In other words, these companies have a limited capacity to finance various projects at the same time, because they do not have assets in their balance sheet. This occurs even when the ESCO takes out a loan for a single project, as in the cases of large clients who need to acquire machinery (via ESCO) to modify processes and repay in 5 to 7 years.

Furthermore, even when the ESCO has a performance contract with its client, the bank doesn't recognize the contract as a receivable, not even in the case that the ESCO client is a sound company, with a reliable balance sheet (such as companies

listed on the stock exchange). The only cases in which they have better possibilities to raise funds are those in which the ESCOs are integrated to major power sector companies.

This barrier is quite similar to those found in other markets such as in financing energy generation projects by traders. As with the ESCOs, energy traders are companies that do not have enough physical assets to raise funds to finance electricity generation projects for the free energy market. Even if the trader has a long-term contract (PPA) with a client, an instrument akin to performance contracts, banks do not accept them as receivables.

b) Energy distribution companies

The major barrier for distribution companies is tied to the regulatory remuneration model. Since these companies are remunerated according to the energy sold, any reduction in consumption — a consequence of energy efficiency projects — causes revenue decrease.

Other project benefits, such as the reduction of peak demand or demand at a particular substation, can financially penalize these companies, since they are remunerated based on their asset base which is enhanced through investments carried out over a four-year cycle. If the investment is smaller than the depreciation of the period because, for example, of consumption reduction, the distributors end up with a smaller regulatory remuneration.

Thus, there is room to study new models of remuneration of distribution

For equipment manufacturers, one of the main difficulties resides in meeting project demand using domestic products. This is because in some cases, the ideal solution for a client is not yet manufactured in Brazil and must be imported.

companies such as the revenue cap, or incentives for energy efficiency that go beyond the mandatory investment. Among these models are remuneration for investments in energy efficiency by a regulatory WACC, remuneration for avoided investment given the success of energy efficiency initiatives, and others. American states like California and countries such as Italy, United Kingdom and Germany have cases that should be studied by power industry agents.

c) **Equipment manufacturers**

For equipment manufacturers, one of the main difficulties resides in meeting project demand using domestic products. This is because in some cases, the ideal solution for a client is not yet manufactured in Brazil and must be imported. However, credit lines with attractive rates, such as BNDES, FINAME, require a minimum percentage of domestic components for their financing. Added to this challenge are issues such as currency risk and high customs charges.

Therefore, one of the possible solutions is identifying the gaps in energy efficiency technologies and carrying out a plan to gradually replace imports of these equipment items. This replacement would begin after the definition of a period in which imported equipment could be eligible for a differentiated tax regime and differentiated energy efficiency credit lines, while the company prepares to produce them domestically. This model is seen in other industries such as in the rules for financing solar panels developed by BNDES for the recent reserve energy auction in October 2014.

A stylized white outline of a globe is positioned on the left side of the page. A white location pin is placed on the upper right portion of the globe, with a solid yellow circle at its tip. The background is a dark teal color with abstract white and yellow circular shapes scattered throughout.

D. International cases

In looking for good practices and solutions for the barriers identified in Brazil, we analyzed 14 successful international cases. Based on a heterogeneous profile of countries, we sought to identify the main instruments, success factors and lessons learned. Among the analyzed countries are developed economies with a high level of energy efficiency such as the US and countries in the EU, developing economies such as China, India and Russia, in addition to regional experiences close to Brazil such as Costa Rica, Ecuador and Mexico.

Analysis of these experiences permitted investigation of key questions for the development of proposals and initiatives for the Brazilian reality, such as:

- What agents and impacts are involved?
- What are the main objectives?
- Which financial institutions participated?
- Which model was used to contract financing?
- What is the scale of disbursement? Is it direct or indirect?
- What are the financing sources?
- What financial and non-financial instruments were used?
- What were the quantitative and qualitative results?

In addition to these issues, we identified a set of factors and initiatives that lead to the success of energy efficiency programs, like:

- Government support and the existence of governance for energy efficiency; some countries had specific agencies for this issue;
- Inclusion of energy efficiency in the scope of the country's GHG emissions reduction initiatives and strategies, either by the government or industrial sectors;
- Development of a market for energy efficiency, with the participation of ESCOs, energy utilities, financial institutions, equipment manufacturers and certification agencies;
- Capacity building of financial institutions with regard to energy efficiency projects, in addition to the inclusion of these products and services in the targets of commercial teams;
- Initiatives for mitigating credit and technological risk for financial institutions such as programs to foster R&D and financial guarantee instruments;
- Projects seen by companies as part of their medium and long-term strategy and/or strategic guideline;
- Development and implementation of risk mitigation and transaction cost reduction instruments, for example, certification of projects, guarantees.

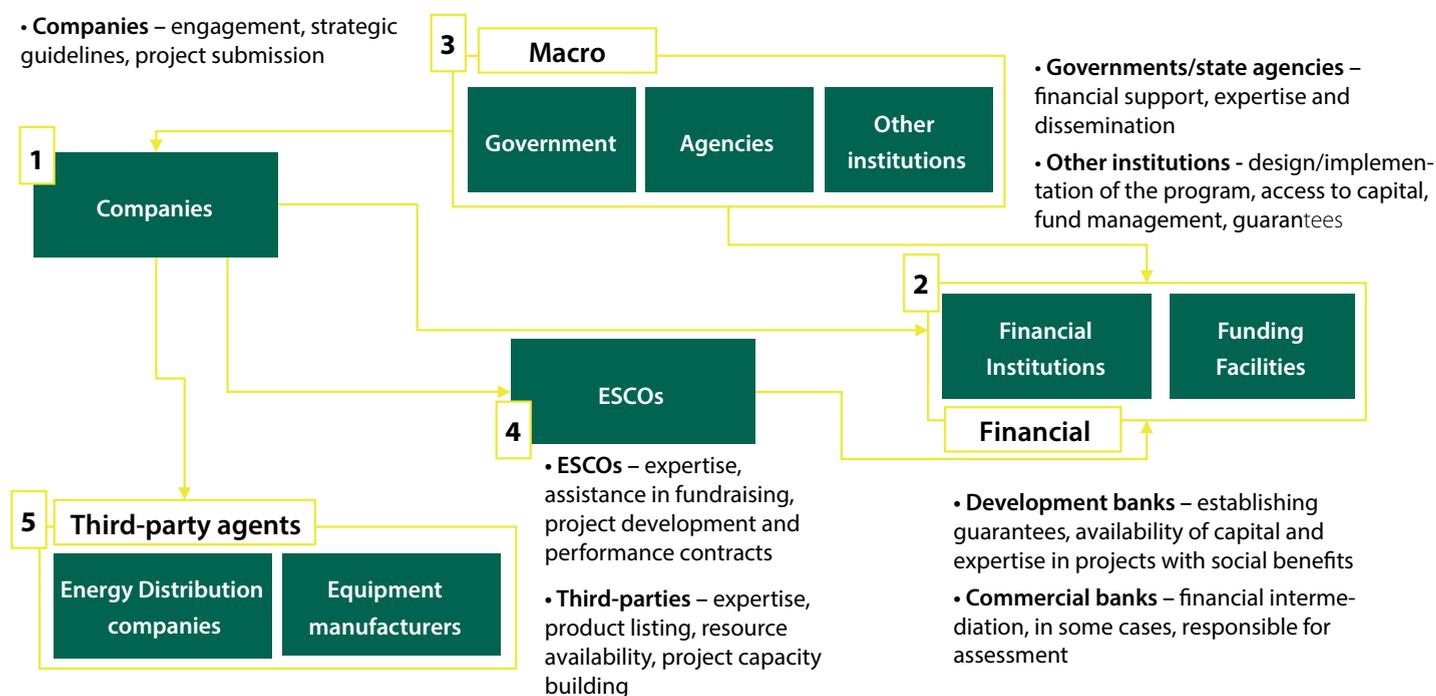
In sum, we verified that the success stories depend on coordinated action and alignment of the various market agents. Establishing standards and certification that

In looking for good practices and solutions for the barriers identified in Brazil, we analyzed 14 successful international cases. Based on a heterogeneous profile of countries, we sought to identify which are the main instruments, factors of success and lessons learned from experiences in these cases.

allow the joint creation of financial and non-financial instruments among project developers (companies and ESCOs) and financial institutions is also essential. These instruments are simple solutions that already exist and/or have been used in other markets or industries, and have been developed according to the specific needs of the target audience.

As to agent coordination, international experience shows that the success of programs depends on the joint action of government, efficiency project developers and third-party agents. Figure 9 shows a summary of the main activities of each of the agents in the success stories.

Figure 9 - Action of market agents⁸



Source: Desk research; CEBDS; SITAWI – Finanças do Bem

More details on the analyzed cases are found in the full version of this paper, available at the CEBDS website.

⁸ Source: own preparation

The background is a dark blue color. It features several abstract, organic shapes in a lighter blue and white. A prominent white outline of a large dollar sign (\$) is centered in the lower half of the page. To the right of the dollar sign, the text 'E. Financial and non-financial solutions for the Brazilian market' is written in a bold, white, sans-serif font. The overall aesthetic is modern and professional.

E. Financial and non-financial solutions for the Brazilian market

Throughout the project, we identified financial and non-financial solutions that could be used in the Brazilian energy efficiency market. In this section, we will present the main solutions together with their expected benefits, risks, impacts and involved agents, enablers and degree of complexity.

Figure 10 shows the mapping of these instruments crossing the expected impact with the level of complexity, both qualitative analyses. In the level of complexity we considered which and how many agents are involved, if there is already something similar or being implemented in the energy efficiency market in Brazil, which countries have already used this solution and which are the major challenges to its implementation. The expected impact takes into account which agents and barriers are impacted, in addition to the benefits brought about by the solution.

Some instruments can be developed individually by market agents, such as FIs and companies. Others will need some coordination and incentives from macro-agents.

Figure 10 - Matrix showing impact and complexity of financial (F) and non-financial (NF) solutions

		COMPLEXITY		
		LOW	MEDIUM	HIGH
IMPACT	LOW	F (v) NF (i)	NF (iii)	
	MEDIUM	F (iii) NF (vii)	NF (ii) NF (v)	F (i)
	HIGH	NF (iv)	F (ii) F (vi) F (vii)	F (iv) NF (vi)

Area where initiatives are prioritized

- F (i) Off balance sheet loan
- F (ii) Performance contracts
- F (iii) Contracts for purchasing energy or selling surplus energy
- F (iv) Alternative models for prioritizing projects
- F (v) Non-repayable funds
- F (vi) Guarantee Funds
- F (vii) Subsidized and/or thematic lines

- NF (i) Standardizing processes
- NF (ii) Listing of technologies
- NF (iii) ESCO Register
- NF (iv) Capacity building of companies and financial institutions
- NF (v) Certification agents
- NF (vi) Establishing governance for energy efficiency
- NF (vii) Market forums

I. Financial solutions

i. Off balance sheet loan - special purpose vehicles

Description: off balance sheet loans are a way of financing an energy efficiency project without needing capital investment (CAPEX). The solution rests in the development of a special purpose vehicle (SPV) maintained during project duration or until the objective or target of the program is reached. In this instrument, the SPV is responsible for raising funds and for the financial management of the project of its associates and for the payment of installments to the financial institution. Payment of these installments is done through a model in which the SPV charges a fee for services rendered — the same amount as the installment — from the associate that develops the project. The credit is guaranteed by the capital contribution that the associates make when creating the SPV.

Benefits: the greatest benefit of this solution is to transform expenditures previously considered CAPEX, which have an impact on the borrowing capacity of the companies, into current operating expenses – OPEX. Thus, the competition for capital between the energy efficiency projects and the remaining investment portfolio of the company is avoided.

Complexity and risks: high. The need for cohesion of interests among a group of companies and the capital contribution to the SPV require a well-defined governance structure. Some companies, due to compliance guidelines, may have difficulties in making this capital contribution, especially multinational corporations. Finally, there is a cost for managing the structure and the SPV resources, in addition to the risk and costs of a possible default of one of the associates.

Enablers: creation of a corporate group or ESCOs with common objectives. Clear and well-defined governance structure. Alignment and study of risks and appropriate procedures for accounting statements both for the capital contribution to the SPV as well as for the payment for services rendered.

Involved agents and/or beneficiaries: companies and/or ESCOs.

Timeframe for implementation in the Brazilian scenario: medium term. A pilot SPV might be launched in the Brazilian market in 2015: the Energy Efficiency Society, a joint initiative of CNI and ABRACE.

ii. Performance contracts

Description: contracts in which the payment to the project developer, a third-party agent, is tied to the efficiency gains of the project (estimated). In other words, the project is financed by this third-party agent, usually an ESCO, who carries out the initial in-

vestment and is paid by the beneficiary with the project savings. These savings are projected, measured and verified according to international standards.

Benefits: as with SPVs, the greatest benefit of this solution is to transform expenditures previously considered CAPEX into OPEX. Performance contracts are also tied to the participation of an ESCO in the project. That is, a third-party agent with suitable technical knowledge is hired to design and execute the energy efficiency project.

Complexity and risks: medium. Most performance contracts are medium to long term (3 to 7 years on average), which implies an association over the same period between the company and the ESCO. There is thus a counterparty risk undertaken by both parties. Another challenge is the lack of knowledge of the companies who wish to develop projects regarding methodologies for calculating expected savings, and measuring and verifying these savings. Lastly, as described above, one of the barriers to energy efficiency financing is the limited capacity that ESCOs have in obtaining credit for large projects.

Enablers: among the enablers are the implementation of non-financial solutions such as the prior registration of ESCOs in credit lines for energy efficiency and capacity building programs. The use of financial guarantees also helps the ESCOs to obtain credit, enhancing their capacity to finance new projects.

Involved agents and/or beneficiaries: companies and ESCOs.

Timeframe for implementation in the Brazilian scenario: short term. Performance contracts are already used in the Brazilian market. It is expected that the implementation of the enablers will increase the use of these contracts as a financing instrument.

iii. Contracts for purchasing energy or selling surplus energy

Description: these contracts are very similar to performance contracts, but payment to the third party is done by selling surplus energy (or purchasing energy in the cases where the asset that generates energy is owned by the third party). The most well-known example of surplus sale projects is cogeneration, particularly in the sugar-ethanol industry. The most well-known example of energy purchasing is the PPA for distributed generation. In this model, a third party, usually ESCOs or energy utilities, invests in the project and is remunerated through a long term energy purchase contract (PPA), signed with the project beneficiary.

Benefits: contract models like PPA, surplus energy sale and energy purchase decrease the need for initial investment by the companies that wish to develop the project. In other words, through these contracts, the payment that would have to be made at the outset is diluted in installments to be paid over a medium/long term period. Again, CAPEX is replaced by OPEX. Finally, these contract models provide a complete solution for businesses, as the third party is responsible for the development, management and maintenance of the undertaking. This is of great benefit to companies that do not have energy management as part of their core business.

Complexity and risks: low. Energy market players and ESCOs have considerable knowledge of these contracts, since they are already in use in the Brazilian market. Among the risks are counterparty risks, as these are medium or long-term contracts. Another complexity is the setting of parameters to be included in the contracts such as adjustments for inflation and variations in the market price of energy. These contracts have a specific market, since they are only used in instances where energy is generated, such as in cogeneration and distributed generation.

Enablers: capacity of companies to identify opportunities for specific projects, policies and incentives for cogeneration, distributed generation and use of thermal processes. Greater dialogue among project developers (energy utilities or ESCOs) and financial institutions to design complete solutions that go from project engineering to its financing.

Involved agents and/or beneficiaries: companies and ESCOs, energy utilities.

Timeframe for implementation in the Brazilian scenario: short term. Models are already being applied in the Brazilian market, especially in sectors in which production waste can be used as energy inputs – sugar cane bagasse, oranges, forest wastes (straw and pellets), among others.

iv. Alternativa models for prioritizing projects

Description: alternative prioritization models for prioritizing aim to include positive externalities of energy efficiency projects when compared to the company's investment pipeline. Among these models are highlighted:

- a) *Lower Differentiated differentiated WACC (discount rate) for energy efficiency projects;*
- b) *Alternative prioritization matrices, based on the inclusion of other variables, in addition to the financial return, such as level of the project's GHG emissions or reduction of the energy intensity of the industrial process;*
- c) *Scoring models that have a ranking based on a set of quantitative (financial return, emissions and others) and qualitative (institutional impact, criticality of the issue, adherence to company's strategic guideline and others) scores.*

Benefits: models include positive externalities of the energy efficiency projects, increasing their competitiveness in raising funds of companies with respect to other projects like expansion of the production capacity. New processes are created in the company that include key sustainability issues in their investment decisions and strategic guidelines.

Complexity and risks: high. There is no standard methodology for including and quantifying these externalities, since these models are still in their infancy and are not part of mainstream management practices.

Usually, non-repayable funds are used by projects that have a high risk perception, and thus, the market pricing of fees makes financing unviable. These funds seek to foster a specific issue or technology/process that is still incipient or not developed in the market.

Enablers: studies together with financial specialists, universities and organizations that work in the field of sustainability to identify existing models and/or the possibility of building new models. Development of pilot projects and exchange of good practices and challenges in forums like CEBDS and industry federations.

Involved agents and/or beneficiaries: companies.

Timeframe for implementation in the Brazilian scenario: long term. The initiative requires studies, pilot projects and experience exchange between companies and market agents. Furthermore, there are a range of companies that still need to take their first steps in the areas of sustainability and eco-efficiency.

v. Non-repayable funds

Description: usually, non-repayable funds are used by projects that have a high-risk perception, and thus, a discount rate too high to generate positive net present values. These funds seek to foster a specific issue or technology/process that is still incipient or not developed in the market. The best-known examples are the funds geared to Research & Development such as the FINEP lines and those of development agencies. It should be stressed that most of these funds are financed by public resources or by international multilateral (or bilateral) development agencies.

Benefits: non-repayable funds foster development and/or local adaptation of new technologies and processes. In assuming the risk of innovation, these funds allow new technologies and processes access to the market, as they will already have a track record. The risk perception is decreased and so is pricing by project funders.

Complexity and risks: low. Non-repayable funds already exist in the Brazilian market and some include energy efficiency projects such as ANEEL's Energy Efficiency Program. Nevertheless, in most cases the development of these funds depends on public resources. This factor turns access slow given the legal procedures and budget dispute. Other complexity factors include the definition of criteria for accessing

the fund, project assessment and defining the model for sharing the intellectual property among resource beneficiaries, creditors and innovation clusters (universities, laboratories, etc.) that take part in the project.

Enablers: dialogue among financial institutions, government and business associations/federations to adapt and define the focus and objectives of the credit line. Definition of governance, criteria for accessing the line and project assessment are key to the success of the fund.

Agents involved and/or beneficiaries: government, financial institutions, companies and third-party agents such as universities.

Timeframe for implementation in the Brazilian scenario: short term. The country has expertise in building non-repayable funds. Need to enhance capacities of companies to identify opportunities and develop a project pipeline that can be financed by these funds.

vi. Guarantee Funds

Description: funds that aim to provide financial guarantees to the funder,

that is, they act as project insurance. In the case of the energy efficiency segment, this instrument is essential as it brings comfort to financial institutions, particularly in projects whose returns are tied to the performance of the generated savings and are developed by ESCOs – they have a lower borrowing capacity than their clients, usually medium and large-sized companies.

Benefits: guarantee contracts facilitate obtaining credit by agents that will seek to pay installments with the expected savings of the project. This instrument is essential for ESCOs, mostly small and medium sized enterprises, who usually have limited borrowing capacity when only their balance sheets are analyzed. Letters of guarantee also allow smaller interest rates given the reduction of the funder's risks.

Complexity and risks: medium. Although this is a common instrument in other financial segments, guarantees for energy efficiency projects in Brazil are new — the first guarantee mechanism (EEGM) was launched in 2013 by Atla Consultoria, together with IDB, UNDP and GEF. Thus, capacity building of market agents regarding this instrument is necessary. Another risk factor is that these guarantees bring an additional financial cost to the project.

Enablers: capacity building of the financial institutions with respect to the guarantee instrument to provide greater comfort to the market regarding this product. Dissemination among companies and ESCOs.

Involved agents and/or beneficiaries: ESCOs, energy consumers, financial institutions (banks, development agencies, etc.)

Timeframe for implementation in the Brazilian scenario: short term. A letter of guarantee has already been issued in Brazil by the Banco Indusval & Partners (BI&P) to finance a project of APS Soluções.

vii. Subsidized and/or thematic lines (may or not be concessional and/or unsecured)

Description: lines with specific focus, be it technological, sectoral and/or thematic. Most of these lines have some kind of subsidies or incentives such as reduced interest rates or no guarantee requirement. This instrument is used both internationally, as the studied cases show, and in Brazil. In the case of energy efficiency, the best-known line is ProESCO, administered by BNDES.

Benefits: thematic lines lead to less competition for energy efficiency resources versus other core projects. These lines facilitate the construction of specific products for energy efficiency and reduce transaction costs since they provide the development of a preliminary list of technologies, equipment manufacturers, ESCOs and compa-

nies/sectors that are eligible for funding. In sum, the process of creating thematic lines leads to a favorable environment for coordination and engagement of various market agents.

Complexity and risks: medium. Thematic lines require coordination among various agents which results in greater complexity in their development. Furthermore, it is necessary to have a design that meets the demands and characteristics of borrowers be they companies or ESCOs. The unsuitable design of either the line or the project assessment process could make funding impossible, as shown by the high idleness of the lines, despite their benefits and subsidies, such as, ProESCO, currently undergoing reformulation.

Enablers: building thematic lines depends mostly on non-financial solutions like listing of technologies, registering ESCOs and third parties as well as on building capacities in companies to obtain this credit. Furthermore, it is essential that financial institutions like commercial banks participate in the financial intermediation of these lines.

Agents involved and/or beneficiaries: government, equipment manufacturers, companies, financial institutions and other agents of the energy efficiency market.

Timeframe for implementation in the Brazilian scenario: short term. Brazil already has thematic lines for both energy efficiency and other areas. In addition, major events like the World Cup, held

in July 2014, and the Rio de Janeiro Olympic Games present a favorable scenario for building these thematic lines.

II. Non-financial solutions

i. Standardizing processes

Description: setting standards for selection and assessment of the performance of projects. This standardization can be achieved by clear specification of:

- a) Project eligibility requirements;
- b) Project categorization;
- c) Stages to be followed after submission;
- d) Procedures and reports for auditing and monitoring performance throughout all phases of the program, with information such as technical risks, financial calculations, energy efficiency and feasibility.

In addition to establishing standard processes specific to the program, national or international seals and certifications can be adopted to facilitate the selection and classification of projects.

Benefits: once processes are standardized, we achieve better understanding of the financing mechanisms. Thus, final consumers and ESCOs can more easily identify the opportunities for submitting projects for financing. Furthermore, there are gains in the perception of suppliers and project developers of market opportunities for developing products and services with regard to project requirements. Government agencies, financial institutions and funds, in turn, can have a better perception of the risks. Standardization allows faster screening and classification of projects, reduced transaction costs and making financing more scalable. In the event of adopting widely known rules and standards, there is the added bonus of making the instrument more popular, decreasing aversion of agents to instruments and contract models, and reducing the spread.

Complexity and risks: low. In standardizing the project screening and classification stages, these stages become less flexible, resulting in some good projects becoming ineligible for funding. Furthermore, as in all standardization, specificities of a certain sector or company may affect it when obtaining credit. Thus, environments and processes should be created within the assessment flow, in which projects that are “different” can be assessed in greater depth. Finally, the strictness of requirements and assessment processes may create extremely bureaucratic procedures.

Enablers: cooperative efforts among government, funds and financial institutions to identify best practices for process standardization. Consolidation of partnerships

with institutions that audit projects and products (like Inmetro); build the capacities of financing teams to better understand the entire credit process, from product development to credit analysis and disbursement.

Agents involved and/or beneficiaries: final consumers, ESCOs, governments, funds and financial institutions and, indirectly, project developers and suppliers.

Timeframe for implementation in the Brazilian scenario: short term. Solution depends essentially on mapping efforts and definition of processes to be standardized. Furthermore, in the case of adopting already existing standards for project screening and classification, there are widely used energy efficiency certifications in the Brazilian market such as the Procel seal and the calls for projects of the energy distribution companies.

ii. Listing of technologies

Description: as with process standardization, the definition of a list of technologies is a standardization instrument for the process of credit pro-

Standardization allows speedier screening and classification of projects, reduced transaction costs and making financing more scalable.

curement. It consists in listing a series of technologies that are eligible for financing in energy efficiency projects. These technologies can include machinery and equipment (such as agricultural machinery, solar panels and refrigeration systems) as well as processes.

Benefits: definition of eligible technologies helps to standardize financing processes. Thus, the screening and classification procedures are facilitated since there are fewer variables to consider. This contributes to a better perception of the risks by financing agents, in addition to a better understanding of the financeable options and requirements by clients and project developers. With this solution, benefits for technology suppliers can be even greater than in standardization of processes in general, because it acts specifically on their market.

Complexity and risks: medium. The pre-definition of technologies restricts – even more than process standardization - the inclusion of projects that have the potential to reduce energy consumption but do not fit in the list. In other words, programs with prior listing have a smaller scope. Thus, in defining which technologies are eligible, the impact of their adoption must be known in order to adapt the listing to the objectives of the program.

Enablers: joint study by financing agents with respect to the technologies used in the country, supported by the relationship with technology suppliers and certification bodies (like Inmetro). Examples such as Carbon Trust show that this process requires continuous updating and revision, both in the inclusion of new technologies as in the replacement of those that are already outdated.

Agents involved and/or beneficiaries: government, financial institutions, funds, project developers and technology suppliers.

Timeframe for implementation in the Brazilian scenario: medium term. The Brazilian market should be studied so that the listing of technologies is not too restrictive or so extensive that it loses sight of its objectives. The process of building the list requires coordinating with other agents and must be very transparent so that there is no perception that this or the other equipment manufacturer has benefited improperly. Thus, the listing process is expected to take a significant amount of time, since it is necessary to define clear stages, inclusion criteria and communications/questioning by these equipment manufacturers.

iii. Registering of ESCOs

Description: registering of ESCOs, consultancies and companies that develop projects for a previously defined list of organizations that can participate in fi-

nanced projects and/or are eligible for financing.

Benefits: to draw up such a register, the criteria that these agents have to meet must first be defined. This will decrease the counterparty risk, which discourages investors of energy financing projects. Therefore, this initiative has the potential to reduce transaction costs, which is focused on the borrowers. The financing process gains credibility and this information leads to greater comfort for the participating financial institutions. In addition, the register can strengthen capacity-building initiatives of these organizations so that they will be better prepared to execute their financed projects.

Complexity and risks: average. There are no similar initiatives in Brazil, so it would be necessary to organize the mapping and classification of these organizations to build a comprehensive and reliable register. In addition, the ESCOs market in Brazil is still in its infancy.

Enablers: joint efforts among government, regulatory agencies, industry associations (e.g. ABESCO) and certification organizations to define methodologies to certify ESCOs and third parties.

Involved agents and/or beneficiaries: ESCOs, consultancies and other project developers.

Timeframe for implementation in the Brazilian scenario: medium term, with a reasonable amount of effort required.

Concession of guarantees by government agencies and international financial institutions for mitigating counterparty risks, described previously, is still one of the more realistic alternatives.

iv. Capacity building of companies and financial institutions

Description: provision of courses, training and capacity building campaigns aimed at companies (potential borrowers) and financial institutions with respect to opportunities, project design, technology, risk and other aspects related to financing energy efficiency.

Benefits: skilled agents are able to identify more opportunities for funding and assess their possible actions and the potential of project impacts and risks. This results in a greater number of credit lines, better project assessment and greater demand for project development. Information asymmetry among the agents can be reduced by courses, training and campaigns facilitating a dialogue among themselves, which is also enabled during interaction in capacity building environments.

Complexity and risks: low, initially it is necessary to identify the levels of knowledge and needs in financial institutions and companies with respect to energy efficiency financing.

Enablers: dialogue among financial institutions, businesses and government, with the collaboration of energy distribution companies. Participation of institutions that already promote the relationship among a large number of institutions of the same group of agents (e.g. Febraban, CEBDS, ABESCO) facilitates the creation of capacity building environments, such as forums, workshops and joint training sessions.

Involved agents and/or beneficiaries: all market agents.

Timeframe for implementation in the Brazilian scenario: short term. In Brazil, there are similar initiatives that involve capacity building, such as the project “Market Transformation for Energy Efficiency in Brazil”, a cooperation effort among GEF, BID and the Brazilian Government, focused on efficiency in buildings.

v. Certification agencies

Description: participation of bodies that certify projects, ensuring that the methodologies are valid, measuring the risk and impact and ensuring the feasibility of these projects.

Benefits: albeit these agents use pre-defined metrics to certify project feasibility and risks, there is a better perception of the risks, in addition to reducing analysis time.

In other words, adaptations for project assessment are minimized, leading to a reduction in transaction costs. Certification agents can further verify if the execution is in line with the plan, ensuring greater quality control. Furthermore, the existence of a methodology for certification can facilitate the development of projects that fit within the constraints of the credit lines.

Complexity and risks: medium. There are international methodologies, but their application to the Brazilian situation must be studied carefully. In addition, in Brazil there are few agents who do this, representing a limited capacity to meet market demands.

Enablers: knowledge transfer by certification institutions, in addition to the actions of government and distribution companies — because of the knowledge inherent to their core activity — in promoting and supporting new certification agencies.

Agents involved and/or beneficiaries: financial institutions, project developers, certification agencies and energy distribution companies.

Timeframe for implementation in the Brazilian scenario: medium term. Initially it is necessary to encourage the creation of certification agents, including supporting their capacity building. Financial institutions should include these certification agencies in their project assessment process.

The most obvious benefit of establishing governance is reduction of institutional insecurity, since the role and limits of participation of each agent is defined in a clear and transparent manner.

vi. Establishing governance for energy efficiency

Description: establishing a system of governance, with definition of rules, processes and coordination among agents, and their roles, in order to enable a more intense and organized activity for financing energy efficiency. This governance can be based on a comprehensive program for the issue, development of a specific agency or the clear definition of the role of each market agent — from government agents to energy distribution companies, equipment manufacturers and financial institutions.

Benefits: as a rule, the more obvious benefit is reduction of institutional insecurity, since the role and limits of participation of each agent is defined in a clear and transparent manner. The greater institutional security reduces the perception of risk for financial institutions and increases the possibility of investments in energy efficiency.

Complexity and risks: high. Depends on a high capacity for coordination among all agents involved in the issue, in addition to requiring discussions on and possible modifications in current legislation. The process requires public hearings, discussion in various forums and constant dialogue between government and representatives of the business, financial and organized civil society sectors.

Enablers: solution depends on the capacity of all agents to negotiate, putting their experiences and objectives on the agenda and seeking best practices. To do so, it is necessary to involve government, companies and civil society, in addition to having to develop specific forums and studies to learn how this process developed in other countries and how to build this governance structure in Brazil.

Agents involved and/or beneficiaries: as the issue is governance, all agents have strong participation, where the government, financial institutions and companies are the ones most involved in this solution.

Timeframe for implementation in the Brazilian scenario: long term. To establish a system of governance that clearly defines the role of agents and the regulatory environment, it is necessary to carry out discussion forums, workshops and studies

that encourage the participation of various stakeholders, in addition to legal processes such as public hearings and consultations. Only after this is done is it possible to arrive at conclusions on legislation and regulation.

vii. Market forums

Description: participation of companies, project developers, ESCOs and other agents in congresses, working groups and other coordination mechanisms with industry associations and institutions (e.g., FIESP), those specifically of the power industry (e.g. Aneel, ABESCO) and others related to the business ecosystem (e.g. Sebrae).

Benefits: greater interaction among agents, encouraging organization of environments for discussion on climate financing and rationalizing efforts in the search for alternatives such as the ones presented in this paper. Furthermore, the participation of consolidated associations that have a large network of associate members facilitates the dissemination of the issue and interest of new agents.

Complexity and risks: low, since Brazil already has consolidated forums in which other issues are discussed by coordinating their networks.

Enablers: as with the preceding initiative, the effectiveness of market forums depends on the coordination of all agents, which is facilitated by consolidated discussion environments.

Agents involved and/or beneficiaries: coordination mainly among companies, ESCOs and project developers in sectoral associations, with the support of government agencies (e.g. Aneel).

Timeframe for implementation in the Brazilian scenario: short term, based on the use of existing structures (industry federations, Aneel, ABESCO, Sebrae, CEBDS and others).

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