

United Nations Environment Programme

Terminal Evaluation of Project on “Developing Financial Intermediation Mechanisms for Energy Efficiency Projects in Brazil, China and India”

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Acronyms and abbreviations

ABESCO	Associação Brasileira das Empresas de Serviços de Conservação de Energia (Brazil)
BEE	Bureau of Energy Efficiency (India)
BNDES	Banco Nacional de Desenvolvimento Econômico e Social (Brazil)
DTIE	UNEP's Division of Technology, Industry and Economics
EE	Energy efficiency
EMCA	Energy Conservation Association (China)
EMCo	Energy Management Company (China)
ERI	Energy Research Institute (China)
ESCO	Energy Service Company
GEF	Global Environment Facility
GERBI	Greenhouse gas Emission Reduction in Brazilian Industry (Canadian cooperation project)
GHG	Greenhouse gases
I&G	National Investment & Guarantee Co Ltd (China)
INEE	Instituto Nacional de Eficiência Energética (Brazil)
IBMEC/CEGEM	Brazilian Research Institute
IREDA	Indian Renewable Energy Development Agency
PROESCO	Brazilian guarantee fund for ESCOs
SBI	State Bank of India
SECIDC	State Energy Conservation Information Dissemination Centre (China)
SIDBI	Small Industries Development Bank of India
SMEs	Small and Medium Enterprises
ToRs	Terms of Reference
UCCEE	UNEP Collaborating Centre of Energy and Environment
UK	United Kingdom
UNEP	United Nations Environment Program
USAID	United States Agency for International Development
3CEE	Three Countries Energy Efficiency Project

Executive Summary

The 3CEE project, or “Developing Financial Intermediation Mechanisms for Energy Efficiency Projects” intended to “achieve major increases in energy efficiency investments by the domestic financial sectors in Brazil, China and India”, the three largest economies in the developing world. The aim was to overcome barriers to financing energy efficiency projects, and to identify financial mechanisms adapted to each country’s conditions.

The project, funded by the United Nations Foundation, was supervised by UNEP/DTIE and UNEP Collaborating Centre of Energy and Environment (UCCEE), (now known as UNEP Risoe Centre) and was implemented by the World Bank for the in-country activities, and by UCCEE for the cross-country activities. It started in November 2002, and was originally planned for 30 months. Although most activities were completed by 2006, a few actions were finalized in 2007.

Between July and September 2008, a terminal evaluation of the project was conducted. It sought to assess the project impact, as well as the extent to which the project objectives and outcomes were achieved. The evaluation reviewed the key activities performed by the project and compared the outcomes to the work plan elaborated during the design phase.

The evaluation methodology included direct and telephone interviews; contacts by email; desk reviews of the project documents, reports and publications. Two missions were undertaken to Brazil (05-12 July 2008) and India (16-23 July). The institutions that acted as the national core group secretariat as well as ESCOs and banks were interviewed during these missions to Sao Paulo, Rio de Janeiro, New Delhi and Mumbai. Due to budgetary limitation, no mission was planned to interview stakeholders and the project core team in China.

The project can overall be assessed as moderately satisfactory. Most objectives were achieved, despite some unequal implementation in the three countries. It is reasonable to state that the level of investments in energy efficiency has been improved through the project activities, at least in Brazil and India, but the evaluation is not able to assess to what extent, due to the lack of monitoring by the financial institutions themselves.

The project succeeded in encouraging domestic financial institutions to better understand and finance EE project, at least in Brazil and India. This outcome is undeniably the project greatest achievement, and required a substantial effort and resources.

The overall performance, in terms of achievement of planned outputs and activities, can be rated from moderately satisfactory to satisfactory. The core groups were formed as planned, and despite some changes and shortcomings, seems to have worked efficiently. The second activity, “commercial banking window”, met mitigated results, but apart from China, can be considered as successful. The development and promotion of ESCOs was mostly positive in Brazil, whereas in China and India, results are clearly limited. The adoption of guarantee mechanisms, directly in Brazil and indirectly in China, can be considered as extremely positive. Support for equity investment remained entirely open; the project having delivered national studies but not following up on results. Local dissemination is assessed as satisfactory, particularly in Brazil and India. Finally the cross-country workshops managed to reach their purpose, i.e. developing exchanges of experience between stakeholders of the 3 countries.

The project clearly raised important issues that still need to be considered, and seemed to have a significant impact in terms of stimulating new initiatives, as can be seen in China with the on-lending facility and the guarantee fund for EMCos.

As far as EE projects funding by financial institutions is concerned, the mechanisms developed by the project will continue without any further financial support, at least in Brazil and India. The project has effectively succeeded in mobilizing key stakeholders in these 2 countries to implement intermediation tools.

The main gap appearing during this evaluation concerns the lack of monitoring regarding the volume of investment that could be attributed to the project, as well as the number of projects directly supported. It is therefore extremely difficult to assess the project impacts on greenhouse gas emissions reduction. Furthermore, the lack of proper project M&E did not allow the project management to identify this aspect and correct it within the project time frame.

Another difficulty came from the imprecise report on the activities pertaining to this project and those supported by other initiatives, particularly in Brazil and India, where for example a number of training and awareness actions, were conducted in collaboration with other donors and institutions, and with the same counterpart at the national level.

Since this is a terminal evaluation, recommendations at this stage would not affect the project outcomes. The main recommendation thus concerns the assessment of such project impacts. It is crucial, when designing financial instruments, to include appropriate monitoring tools in order to obtain a clear picture of the volume of investments, the foreseen energy savings, and the corresponding GHG emissions reduction.

I. Introduction and Background

The three country energy efficiency project (3CEE project) or “Developing Financial Intermediation Mechanisms for Energy Efficiency Projects” intended to “achieve major increases in energy efficiency investments by the domestic financial sectors in Brazil, China and India”, the three largest economies in the developing world. The aim was to overcome barriers to financing energy efficiency projects, and to identify financial mechanisms adapted to each country’s conditions.

Activities included technical assistance, training, and applied research, as well as cross-country cooperation activities. The four main topics were:

- Development of commercial banking windows for energy efficiency projects
- Support for ESCOs
- Guarantee funds for energy efficiency
- Equity funding for ESCOs/energy efficiency projects

The project, funded by the United Nations Foundation, was supervised by UNEP/DTIE and UNEP Collaborating Centre of Energy and Environment (UCCEE), and was implemented by the World Bank for the in-country activities, and by UCCEE for the cross-country activities. The project started in November 2002, and was originally planned to have a duration of 30 months. Although most activities were completed by 2006, a few remaining ones were finalized in June 2007.

The project has been subdivided into two sub-projects according to the role of the two Implementing Agencies:

- In-country activities (World Bank)
- Cross-exchange workshops (UCCEE)

A third component concerned the role of UNEP as supervision and backstopping agent. An overall project summary combined the activities described in these components.

It is estimated that the emissions of greenhouse gases from the three countries will more than double in the next 20 years. The potential for energy efficiency is extremely high, but is presently limited due to financial, technical, institutional and awareness barriers. The financial barriers, and especially access to capital, are often perceived as the most important. Domestic financial institutions were seen as the most suited to providing credit for energy efficiency investments, but, at the project design phase, were still facing some barriers related to high transaction costs, high perceived risks and lack of technical skills, which the project attempted to address. The project therefore designed a set of activities to overcome these barriers, targeting the banking sector and energy service companies in each country.

II. Scope, Objectives and Methods of the evaluation

This terminal evaluation aimed at assessing the 3CEE project impacts, as well as reviewing and evaluating the level of implementation of the project activities and outcomes. The evaluation objective is therefore to “determine the extent to which the project has been successful in fulfilling its objectives and obtaining the expected results and whether it has been cost effective in producing its results”.

The expert’s Terms of Reference included the following questions:

- To what extent has the project helped to foster the further development of energy efficiency project packaging capacity in the domestic financial sectors and ESCOs in Brazil, China and India?
- Determine how and the extent by which this project has helped the three countries realizing their potential for greenhouse gas emissions reduction from EE projects.

These ToRs can be found in Annex 5.

The evaluation methodology included the following components:

- Desk review of project documents
- Review of specific project outputs, namely publications and websites
- Telephone interviews with relevant UNEP/DTIE and UCCEE officers involved in the project
- Telephone interviews with relevant World Bank officers involved in the project
- Telephone and personal interviews with relevant stakeholders
- Field visits and direct interviews with the project core groups in Brazil and India.

A list of the persons interviewed is presented in Annex 2; the documents reviewed during the evaluation are listed in Annex 3, and the websites consulted are included in Annex 4.

Due to budgetary limitation, no mission was planned in China. It is to be noted that despite the evaluator’s and the UCCEE team’s efforts to reach the members of the Chinese core team (by email and telephone), no personal contact could be established. The assessment of the project activities in China are thus based on the China Final Country Report made in May 2006 and interviews with staff at the World Bank in charge of China.

III. Project Performance and Impact

3.1 Attainment of objectives and planned results

The project's specific objectives were:

- To achieve major increases in energy efficiency investments by the domestic financial sectors in Brazil, China and India through developing energy efficiency investment project packaging capacity, both in existing institutions and through new entities;
- To stimulate an increased capability and willingness of local financial institutions in Brazil, China and India to extend loans to commercial borrowers wishing to make energy efficiency investments in the commercial and industrial sectors of their economies

The planned outcomes and expected results were:

- Establishment and operation of Core Country Groups
- Development of a commercial banking window for energy efficiency
- Development of and support to ESCOs
- Studies and development of options for guarantee facilities
- Studies and development of options for equity investments
- Cross-country exchanges on banking windows, ESCOs, equity financing and guarantee funds

3.1.1 Effectiveness

The overall project summary and the two sub-project documents (one implemented by UCCEE, and the other by World Bank) included a logical framework with achievement indicators. The project effectiveness is therefore assessed against these indicators to measure the level of achievement of the project objectives.

Immediate impact of the project on national management capacity to reduce greenhouse gas emissions

Increased capacity of local stakeholders to support profitable EE projects

a) Financial sector

As far as banks are concerned, some concrete results can be attributed to the project efforts. Given the different institutional frameworks in the three countries, different approaches were chosen.

In **Brazil**, several public and private banks have integrated energy efficiency within their portfolios, generally in their sustainability or environment credit lines, as a result of the 3CEE project. Other credit lines, such as the sustainable building construction line at Banco Real, are also used for this purpose. Furthermore, the Banco Nacional de Desenvolvimento Econômico e Social (BNDES) has launched a guarantee fund for ESCOs (PROESCO) in 2006, which is available as: i) a credit line for any energy efficiency project requested by the beneficiary itself, and ii) a guarantee fund for ESCOs. These projects should be submitted through public or private banks, and for the ESCOs guarantee to operate, the bank must have signed a convention with BNDES for sharing the guarantee. The loan issued by BNDES covers up to 90% of the project costs, and the guarantee is divided between the bank (minimum 20%) and BNDES (maximum 80%). The funds available under PROESCO are

unlimited for direct loans; for the shared risk guarantee facility, a provision of RS 100 million (equal to US\$30 million) can be made available, but this amount could be increased if necessary. So far, only two banks have signed the convention with BNDES (Banco do Brasil - public, and Itaú - private), but another 5 to 8 banks are showing their interest.

In **India**, the option for establishing a guarantee fund has been studied then rejected because of the limited operations of ESCOs in the country (see below). The project encouraged five banks in drafting dedicated credit lines for energy efficiency; three of them were actually implemented, targeting SMEs. However, according to the banks themselves, energy efficiency is considered only as a part of their portfolios, being integrated within broader loan packages, e.g. the State Bank of India's (SBI) technology clusters, where the bank provides loans and advice to a group of industries from a specific sector in a particular region ("projects uptech", such as the modernisation of rice mills in Palakkad, the foundry sector in Kolhapur, auto components in Pune). The bank has created over twenty clusters in the country in the last 20 years, where it financed measures related to production processes, but also better use of resources, energy efficiency, waste management, pollution control, marketing, introduction of new technologies. These loans are granted as a comprehensive package, rendering energy efficiency investments difficult to account for separately from other measures. There is no specific tool permitting an assessment of energy efficiency projects. This finding is in contradiction with the existence of specific credit lines, as declared by the banks and reported in the project final documents. If these financial tools were directed only to energy efficiency, the number of projects and volume of investment funded by them would be easier to calculate.

In **China**, a pilot project was launched to convince banks to adopt EE financing schemes and to demonstrate a project appraisal methodology. However, when proposed with 12 projects identified by the core group, banks did not finance any. Reasons given for this are external (Severe Acute Respiratory Syndrome affecting some key staff; change of personnel in the core group secretariat) as well as strategic (project volume was estimated too small by banks to justify the required involvement). Furthermore, it seems that the bank personnel involved in the project did not have the capacity for decision-making and did not succeed in convincing their hierarchy in taking up EE financing. The World Bank, GEF and the Chinese Government initiated a guarantee fund in 2003 to support EMCos (see below) partly on the basis of the conclusions drawn from the 3CEE project.

b) ESCOs

The present capacity for ESCOs to identify and implement EE projects in industry should be differentiated by country.

In **Brazil**, there are approximately 55 ESCOs members of ABESCO, the national ESCOs association, who are active in the industry. They often face difficulties in convincing companies to develop projects on their premises, because of the common indifference regarding energy use or a lack of understanding about the potential that costs saving energy efficiency projects could represent. Nevertheless, ABESCO has organized a number of local and regional workshops to inform SMEs on the topic and to invite them to submit project ideas. These ideas were then sent –anonymously - to ABESCO's members for them to decide on a follow-up. Each workshop yielded 12 to 16 project ideas in average, but some of them are located in remote areas or too small to be considered by ESCOs. The Association plans to organize these events on a regular basis in the future. It must be noted that the Brazilian ESCOs came-up with some innovative approach: four of them decided to pool their resources

and efforts to realize eight projects in the ceramic industry instead of trying individually to implement one or two projects, thus reaching a critical mass to make these projects worth their while and acceptable to banks. The bundling of projects made them more attractive financially; the technical and legal capacity of the ESCOs involved was also increased. This approach thus enabled the realization of more projects than could have been implemented without such cooperation.

In **India**, the concept of ESCOs is not well accepted by the industry. In fact, there are only a couple of ESCOs, whereas a number of equipment suppliers also propose to monitor energy savings after the installation of their technologies. Only a few of them established performance contracts¹ in industry. Although energy audits are compulsory in large energy intensive companies, smaller enterprises are generally unaware of their energy costs. They are also often reluctant to let an external agent take over part of their process or operation. When shown that energy savings are possible, they tend to decide to either finance directly the measures themselves, or to take a small credit with their bank. The Director of the ESCO interviewed in New Delhi declares that the industry does not represent the best market for Indian ESCOs. For his company, implementing energy efficiency in public buildings offers larger business opportunities. As a direct outcome of the cross-country activities, this Indian ESCO has been requested by a couple of Chinese industries to develop energy efficiency measures. They are now negotiating several projects that would be implemented in the near future by this Indian ESCO in China.

The idea of creating an association of ESCOs, on the Brazilian model, has been abandoned, because of the limited number of energy service companies operating in India.

The Bureau of Energy Efficiency (BEE) in India is studying the possibility of introducing a partial risk guarantee fund by 2009 in order to help those ESCOs borrowing from banks. The decision should be forthcoming in the next few months.

In **China**, three ESCOs (or EMCos – Energy Management Companies) were created through a World Bank/GEF project in 1998. Since then (until 2005), they have invested in over 420 projects using energy performance contracts during the supporting phase. A national association of these energy management companies (EMCA) was created in 2004, and now registers over 100 members. A study conducted in the framework of the 3CEE project showed that the amount of private equity investment in EMCos was relatively low, due to a low capacity of EMCos to elaborate business plans, a shortage of finance available in the sector, the limited scale of EE projects, the difficulty of some banks to provide equity, and the lack of knowledge of the financial sector regarding the existence of EMCos. The 3CEE project did not manage to solve these issues, but, by 2006, a total of 23 EMCos were granted guarantees on loans in the frame of the World Bank/GEF project, covering 52 projects, for an amount of approximately US\$20 million. If the 3CEE project is not directly answerable for these investments, they can be considered as indirect results, since the 3CEE project activities in China emphasized the lack of a guarantee scheme that was later implemented by the World Bank with support from GEF.

¹ Energy performance contracts are contracts signed between the ESCO and its client, guaranteeing the level of energy savings that will be reached through the implementation of energy efficient measures or efficient equipment. Since they represent the basis for the calculation of the ESCO's profits and for the assessment of the project duration, they can be used by banks to calculate the viability and profitability of an investment. This is notably the case in Brazil.

In **Brazil and India**, the level of investment in energy efficiency is practically impossible to assess, due to the lack of monitoring of the banks procedures. None of the banks have introduced specific criteria to track down projects directly or indirectly connected to energy efficiency. In Brazil, commercial banks classify energy efficiency projects under “sustainability” or “environment” credit lines, while in India, they are usually either within “technology clusters” or “equipment purchase”. No specific accounting of volumes loaned is being made, although Banco Itaú (Brazil) plans to introduce new procedures to flag their energy efficiency projects. In China, no actual investment by banks can be directly attributed to the 3CEE project.

There is no available data permitting to evaluate the number of EE projects financed by the Indian banks in energy efficiency. These investments are accounted together with other financial products, there are therefore no means to assess their impact. In Brazil, the information collected during interviews show that three projects have received an agreement to be funded through PROESCO, although without using the guarantee scheme. This means that PROESCO granted conventional loans, while the mandated bank (in that instance Banco do Brasil) fully assumed the risks related to the investment. One project with shared guarantee is under discussion between Itaú and BNDES; another 27 projects are being prepared by ESCOs, and a dozen projects presented by banks (without shared guarantee) are presently in the pipeline. No indication on the volume of investment is available.

According to the banks themselves in Brazil and India, important steps have been taken to consider energy efficiency as a viable and profitable product. It is therefore reasonable to state that the level of investments in energy efficiency has been directly improved through the project activities, at least in Brazil and India, while in China, only indirect effects can be measured. However, the evaluation is not able to assess to what extent, due to the lack of monitoring by the financial institutions themselves. It is therefore not possible to verify if the project goal to reach \$150 million invested in energy efficiency projects by local financing facilities in the three countries has been reached.

Increased awareness of domestic financial institutions

This is undoubtedly the greatest achievement of the 3CEE project. All the banks staff interviewed in Brazil and India, who for most of them participated in the cross-country activities, expressed that the project helped them in understanding the crucial role that energy efficiency could play in greenhouse gas emissions reduction, and most are now enthusiastic about supporting EE projects. In Brazil, a new dialogue between banks, the industry, ESCOs and the state was viewed as very positive by all interested parties. In India, banks are now encouraging SMEs in investing in energy efficient projects. The main success is that bankers now consider energy efficiency projects like any other type of investment, and that they feel in a position to offer their clients products not yet fully requested by the market. SIDBI has included energy efficiency and clean development mechanisms in their loan policy for 2009.

Thus an important project result is the implication and the commitment of the financial community in both Brazil and India to include energy efficiency in their investment portfolios. In China, the project was unable to convince the banks’ senior management to do the same.

Development and adoption of new methodology for promoting private sector driven EE projects by UN agencies

One of the evaluation criteria was the assessment of the extent to which the project contributed to the elaboration of a new methodology that could be used by UN agencies when implementing actions aiming at financing energy efficiency projects. This aspect was however not included in the project outcomes; the UCCEE project document referring to the elaboration of methodologies related to appraisal of EE projects and financial structuring of EE projects.

Nevertheless, since the development of such a methodology would be an asset for future projects to be implemented by UN agencies, the evaluator has provided some elements for the elaboration of a comprehensive approach concerning the financing of EE projects. This methodology should not only include instruments targeting the financial sector, but also take into account external factors, such as policy, legal, institutional and stakeholders' awareness issues. Important barriers, such as the existence of incentives for the industry to undertake energy efficiency measures; regulation concerning energy audits or public procurement (thus creating or strengthening a market segment), codes and standards; the market actors' needs or awareness, should be considered when developing intermediation mechanisms.. The sole existence of financial tools does not imply that they will be utilized by potential clients, if these clients do not have a clear understanding of energy savings issues, or if they are not compelled to invest in energy efficiency by a strong regulation.

Additionally, monitoring and evaluation tools to assess the level of investments and the number of projects funded by the banks should be included in the design of the financial instruments in order to keep track of the environmental benefits of the mechanisms thus implemented.

It can be noted that the World Bank recently issued a publication concerning "Financing Energy Efficiency – Lessons from Brazil, China and India", which draws the key features for success in elaborating financial mechanisms for energy efficiency projects. Concerning market development, the book lists some factors for success:

- Investment delivery mechanisms should be customized on the basis of an in-depth review of local conditions;
- End-users should face commercial terms for the financing and technical services being provided;
- Positive incentives should be granted to end-users, but designed not to distort the market.

This book can be considered as a basis on which UN agencies could build a methodology for developing projects in promoting private financing of EE projects. Staff at UCCEE mentioned that this has not been done so far.

Longer-term impacts

This section summarizes the potential development for EE project financing that can be – directly or indirectly – considered as a result or follow-up of the 3CEE project. Some recommendations to improve financial intermediation in the 3 countries are presented in Chapter V.

The most important project impact is that banks, at least in Brazil and India, have taken and will continue to take steps to finance energy efficiency projects. The availability of funding

for such projects is a major achievement; the financial products created during the 3CEE project or after its completion will remain in place.

PROESCO, the **Brazilian** guarantee fund implemented by BNDES, met some difficulties at the beginning of its activities, mainly due to the lengthy administrative procedures and the relative small size of projects. However, in continuous dialogue with commercial banks, BNDES is progressively introducing improvements for accessing the fund. The Brazilian stakeholders unanimously declared that the fund is a very useful instrument for this sector. It is expected that an exponential number of projects could be submitted and funded through PROESCO. Commercial banks will continue to provide loans for energy efficiency, while certainly implementing a procedure to account for the energy savings generated by the projects they supported in the near future. However, some strong barriers to energy conservation in Brazil remain and prevent the achievement of significant energy savings. These include gaps in the national energy policy and legislation, the remaining lack of capacity of ESCOs to develop contracts, and the general lack of awareness of end-users. Recommendations to overcome these barriers are presented in Chapter V.

Energy efficiency is now being considered as any other product by the Indian banks involved in the project, particularly the three that introduced EE schemes for SMEs. In SBI for example, it was reported that local branches now advise their clients to adopt energy efficiency measures, thus reducing their operational costs and improving their industrial processes. The banks consider that increasing energy efficiency in industry will help their clients, mostly SMEs, to improve their costs competitiveness and profitability and will therefore create opportunities for further investment leading to the companies' expansion.

In **India**, the opportunity to use the existing Credit Guarantee Fund Trust for Micro and Small Enterprises, managed by SIDBI, for guaranteeing ESCOs operations, came into discussion during the evaluation interview. This fund extends guarantee for credit facilities (both term loans and working capital) sanctioned by Member Lending Institutions (financing institutions having signed a convention with SIDBI) to micro and small enterprises (industry and trade). The guarantee cover 75% of the loan amount - 80% in case of companies operated by women or located in the North East region. The procedure is very simple and rapid: an answer is provided by SIDBI within 24 hours after the request has been received by the bank. SIDBI would be open for negotiating the eligibility of ESCOs to access the fund through conventional financial institutions.

In **China**, some progress towards the adoption of specific mechanisms for EE seems to be secured through the two World Bank/GEF projects on on-lending facility and guarantee fund for EMCos.

The Energy Efficiency On-lending Facility has been designed by the World Bank to address the risks of large EE project lending. The focus of the project is to promote direct bank financing of medium and large-size EE projects. This initiative can be seen as a direct follow-up of the 3CEE project. Started in 2007, it included 5 major components:

- A dedicated World Bank loan to finance large scale EE investments through financial intermediary lending;
- Technical assistance for Chinese banks to establish EE financial businesses and to develop project pipelines;

- Technical assistance for 2 to 3 energy intensive industries for the preparation of pilot projects;
- Technical assistance to the government for establishing a regulatory environment conducive to large-scale EE financing;
- Project management, monitoring and reporting.

The Guarantee Fund for EMCos is an initiative implemented by the World Bank/GEF Energy Conservation Program (Phase II) for China. Its objective is to catalyze a high level of EMCos project investments. The Fund started in 2003, with an initial tranche of US\$11 million. The China National Investment and Guarantee Co. was selected as the agency to implement and administer the program.

3.1.2 Relevance

The project definitely falls within UNEP's core mandate and mission to develop awareness on global environment issues and to promote and support the objectives of international conventions regarding climate change.

The project outcomes are clearly consistent with the focal areas and operational program, through the development of financial mechanisms to support EE projects. They also participate in meeting the three countries' priorities in terms of greenhouse gas emissions reduction.

3.1.3 Efficiency

From the various interviews conducted during this terminal evaluation, particularly with the UCCEE and the World Bank staff, it seems that the project cannot really be considered as cost effective. The main reason for this lies in the large amount of labour that was necessary to bring to project to an end, namely because:

- The time to convince banks to implement EE credit lines had been underestimated in the project preparation phase;
- Changes in the core group secretariats (two times in Brazil, one in China) implied delays in drafting new work plans and initiating activities at the national level;
- The number of contracts for international and national consultants has been very large. They included over 25 contracts with the core group secretariats, international experts for project management and supervision of national activities, and national consultants for undertaking sector or specific studies;
- The fact that, initially, the World Bank desk offices in Brazil, China and India should have been strongly supporting the implementation of the project, but due to the withdrawal of the World Bank staff in Brazil and India, other persons had to take over.

The project clearly built on earlier initiatives and developed strong links with projects that were implemented in parallel. The most important ones are described under §3.4 Catalytic Role.

There was no in-kind co-financing, contributions of cash were third party donations from the World Bank, ESMAP and the UK bilateral cooperation, as indicated in the project documents.

3.2 Sustainability of project outcomes

3.2.1 Financial resources

As far as EE projects funding by financial institutions is concerned, the mechanisms developed by the project will continue without any further financial support, at least in Brazil and India. The project has effectively succeeded in mobilizing key stakeholders in these two countries to implement intermediation tools. There is no doubt that the trend thus created will be pursued, although staff mobility within some banks should be compensated by a larger involvement of other persons in the existing schemes to ensure continuity and expansion. This is however not the case in China. Further support from international organizations seems to be needed to encourage the development of energy efficiency projects.

Concerning ESCO development, some additional support might be requested to ensure an expansion of the sector. Private efforts (particularly from the ESCOs themselves) should be encouraged by public support through targeted actions: training in technical, legal and market issues; introduction or strengthening of policy measures (energy auditing, public procurement issues). In China, the World Bank will continue its action to provide a better financial environment for EMCos.

3.2.2 Socio-political factors

The socio-political context is widely different in each of the three countries involved in this project. In **Brazil**, energy efficiency is not recognized as a priority; investments are concentrated on power generation rather than the demand side. In **India**, there is a deeper concern regarding energy conservation, and measures to improve energy efficiency are being implemented. In **China**, there is a strong political commitment to limit the greenhouse gas emissions at the national levels, but the instruments to reach significant energy saving levels are still to be developed.

In the three countries, awareness related to energy efficiency is generally rather low.

3.2.3 Institutional framework and governance

This is an issue that was not properly treated by the project, since little attention was paid to the institutional, legal and policy frameworks both during the design phase and the implementation of project activities. This situation led to creating gaps in the performance of some activities, particularly in China. It is to be noted that in the China Final Report, mentions that “government support is imperative for creating a favourable policy environment”.

3.2.4 Environmental aspects

Theoretically, the project should contribute towards environmental benefits, especially in the reduction of greenhouse gas emissions. It is however not possible to assess to which extent because of the lack of information and monitoring system to evaluate the number of EE projects and the volume of investments directly or indirectly generated through the project activities.

There is no indication that the project should have any negative impacts on the environment.

3.3 Achievement of outputs and activities

This assessment is based on the list of outputs and activities presented in the three sub-projects summaries, compared to the actual results as documented by interviews and a review of reports and other documents (see Annex 3).

The indicators as suggested in the sub-project “Implementation Phase” are difficult to verify. This is the case for example of the participation of financial institutions in the development of appraisal methodologies; it seems that in most cases banks were requested to assess the approaches adopted but did not actively participate in their elaboration. The terminal evaluation therefore concentrated on the products themselves and their impacts on the stakeholders.

Establishment and operation of the core country groups

The establishment of the national core group was performed according to the original plan. During the project implementation, a few changes were introduced to the core group secretariat in Brazil and China, due to institutional difficulties or staff mobility. The core group secretariat participated in the elaboration of the detailed work plans prepared at different stages during the project in collaboration with the World Bank and its consultants.

In **Brazil**, the secretariat of the core group was first taken by ABESCO and INEE as coordinator. In 2002, a new secretariat was designated: IBMEC/CEGEM, a nucleus working on energy and environment issues at a renowned business school. However, in 2004, given the closure of CEGEM, ABESCO reassumed the secretariat until the end of the project. The core group was composed of the following members:

- Instituto Nacional de Eficiencia Energetica (INEE)
- Winrock International
- Centrais Eletricas Brasileiras (Eletrobras)
- Associacao Brasileira das Empresas de Serviçoes de Conservacao de Energia (ABESCO)
- Federacao Brasileira dos Bancos (FEBRABAN)
- Ministerio de Minas e Energia (MME)
- USAID Brazil

In addition, the following banks were actively participating in the national and cross-country activities:

- BNDES
- Banco Itaú
- Banco do Brasil
- Banco Modal

The **India** Core Group comprised representatives of the following stakeholders:

- Indian Renewable Energy Development Agency (IREDA)

- State Bank of India
- Punjab National Bank
- Syndicate Bank
- Credit Guarantee Trust Fund for Small Industries
- DSCL Energy Services
- Saket Projects Ltd.
- Federation of Indian Chambers of Commerce and Industry
- Technology Bureau for Small Enterprises

where IREDA and two external consultants assumed the secretariat.

Participants in the **China** Core Group were:

- Energy Management Companies' Association (EMCA)
- The State Energy Conservation Information Dissemination Centre (SECIDC)
- The Energy Research Institute (ERI)
- The China Energy Conservation Investment Company
- The Construction Bank of China
- Huaxia Bank
- Project Management Office for the China Energy Conservation Project

The Secretariat of the China Core Group was originally with SECIDC but was shifted to EMCA in 2004 due to personal changes and internal restructuring at SECIDC. The following bank participated in meetings and activities of the core group:

- Minsheng Bank
- Shanghai Bank
- Everbright Bank
- Shenzhen Development Bank (Beijing Branch)
- The China Development Bank
- The China National Investment & Guarantee Co. Ltd

Commercial banking window

In the three countries, banks have been closely associated to the project activities at the national and cross-country levels. It can be noted that, as planned, the project managed to contact and work with 5 to 10 banks per country. Their participation in the definition of appraisal methodologies seems concrete, where banks were associated in the discussions about the design of models for financing EE projects. However, according to the project

manager, banks were rather passive in this regard in Brazil. In China and India, banks also contributed to the assessment of the approaches designed by consultants regarding project appraisal.

The financial sector's involvement in designing alternative financial products can be assessed as positive at least in Brazil and India:

As described under §3.1.1, a number of Brazilian banks have decided to include energy efficiency in their portfolios, usually under the sustainability line. This is a direct outcome of the 3CEE project, which significantly raised the awareness of bankers to the potential market represented by energy efficiency. The core group initiated various individual and common meetings with banks and ESCOs, leading to a better understanding of each stakeholder's set of difficulties and allowing for overcoming some obstacles, such as the perceived high risk usually associated with EE projects. A project appraisal manual was prepared by the core team and consultants. A review of the use for EE of the electric utility public benefit wire-charge² regulated by ANEEL, the national regulatory agency, was initiated in 2004. A year later, ANEEL announced its decision to suppress the allocation of wire-charge to EE and transfer them to low income consumers. Finally, a compromise was adopted, fixing a rate of 0.25% of the utility revenues to be used for EE projects.

In 2004, the Chinese core group discussed a new approach and decided to conduct a detailed research related to the various obstacles facing EE loan financing. ERI was later that year commissioned to investigate on-lending avenues for energy efficiency, and an independent consultant was hired to assess the potential for equity investments in the EE sector. The Chinese core group devoted a large sum of efforts and resources to elaborate project appraisal methodologies and identify 12 pilot projects. However, as stated earlier, no specific instrument was created in China in order to facilitate EE investment by the financial sector, and none of the pilot projects have been implemented.

The 3CEE project nevertheless laid the foundation for the adoption of the World Bank's energy efficiency on-lending facility in China, which focuses on direct bank financing of medium and large scale EE projects.

In India, 3 banks have introduced credit lines to finance EE projects in SMEs. The project's main achievement is the increased awareness of bankers regarding energy efficiency and its potential contribution to abate greenhouse gases effects. The Indian core group led or sub-contracted three studies in the industry (steel re-rolling mills, pulp and paper, and glass) to demonstrate the potential markets and to identify pilot projects. They also developed a project appraisal manual for EE projects. The evaluation was not able to conclude to which extent this manual has been or will be used by banks; the banks interviewed stated that they use their own appraisal methodology, usually based on conventional risk rating.

² A public benefit wire-charge was created as part of the reform of the power sector initiated by the Brazilian Government in 1995. The objective was to assure that certain public policy objectives were maintained in the context of privatized utilities and liberalized markets. Clauses mandating EE investments were included in all privatizations of distribution utilities and were also included in the concessions of the publicly-owned utilities when these were renewed. Starting in 1998, the EE investment requirement was formalized through resolutions of ANEEL, in the form of a wire-charge of 1% of net utilities revenues. The allocation of resources is subjected to regulations by ANEEL which also approves the project proposals of the utilities and oversees compliances with norms, etc. However, utilities are responsible for designing and executing all the programs and projects. (Source: 3CEE Brazil Final Report).

ESCO development and promotion

The indicators listed in the work plan of the sub-project “Implementation Phase” are unclear and difficult to assess: “ESCOs supported by core group products (3-10 per country)” does not make real sense. However, it is clear that a significant effort has been dedicated to ESCO development and promotion, as described below. It seems that only one project was actually implemented by an Indian ESCO during the 3CEE project, whilst the project was aiming at three in India and Brazil. No similar indicator was set for China. The Indian ESCO mentioned that, due to lengthy procedures and heavy transaction process, their profit on the operation was negative.

In Brazil, ABESCO designed and disseminated a questionnaire to its members in 2005. The response was modest; 15 ESCOs out of 40 contacted provided answers. The purpose of this questionnaire was to identify the ESCOs’ current market and their perspectives for development. Answers showed that one major obstacle was the high interest rate imposed by banks for ESCOs operation, due to the risk perceived as high by financial institutions.

ABESCO, as the national association for ESCOs, is responsible for assisting its members in developing their markets. During the 3CEE project and since, the association has organized, with fair success, workshops to identify potential projects that could be implemented by ESCOs in the industry. It is to be underlined that Brazilian ESCOs came up with innovative ideas to bundle projects and resources when realizing that individual companies were unable to provide services to the requests expressed by some industrial sectors, such as the ceramic.

A mini-exchange meeting was organized for ESCOs in Beijing in November 2003 as part of the 3 CEE project. Its objective was to discuss the ESCO markets and operations, financial risks and market opportunities, and to present the concept of energy performance contracting (see footnote n°1). Four ESCOs of each participating country attended the workshop. Presentations related to marketing of ESCOs services and opportunities for new market development were made by consultants. A large part of the workshop was dedicated to an exchange of experience between ESCOs of the three countries. The Indian Secretariat subsequently organized a meeting with other Indian ESCOs, financial institutions and the core group members in Mumbai in December of the same year, to disseminate the information collected during the workshop. There is no indication of a similar follow-up from the Brazilian or the Chinese core groups.

In China, EMCA, the China nationwide EMCOS association, was founded in 2004 in the framework of bilateral cooperation with the UK. Its activities include training for its members, assistance to overcome financial barriers and improve the quality of their loan applications. In 2006, EMCA conducted a survey among its members to assess their experience with regard to various financing approaches, showing that a majority still depend on their own internal funds for implementing EE projects. In the framework of the 3CEE project, a detailed study was conducted in 2006. It concluded that there is a relatively low amount of private equity investment in the sector, because of the limited capacity of EMCOS to submit clear business plans, a shortage of finance available in the sector, the limited scale of EE projects, the difficulty of some banks to provide equity, and the lack of knowledge of the financial sector regarding the existence of EMCOS.

Indian ESCOs, as described under §3.1.1, are mostly technology or equipment vendors; there are only a couple of “real” energy service companies. The 3CEE project did not succeed in supporting ESCOs in developing their market in the industry, given the reluctance of industrial SMEs to have a third party interfering in their plants. The most promising market

for ESCOs in India is the public sector, where a significant improvement of energy efficiency is possible, and where the lack of available public funding may render ESCOs activities particularly attractive to public authorities, particularly for public lighting and building retrofit.

In summary, results of this activity were partly achieved:

- the capacity of ESCOs, particularly in Brazil and partially in China, to develop performance contracting and ESCO models has been increased, but their capacity for elaborating business plans agreeable to banks still needs some strengthening;
- the formation or strengthening of ESCO association has been performed with success in Brazil and China, while the idea of creating an association in India has come to nought, due to the limited number of ESCOs;
- the preparation of project agreements between ESCOs and end-users can be assessed as positive in Brazil, but not in the other two countries.

Guarantee mechanism

The extent to which actual detailed study regarding guarantee funds were undertaken, apart from Brazil, is unclear.

A report concerning the design of a guarantee fund for Brazil was prepared in 2002. The fund created in 2006 by BNDES, however, differs from the options presented in this report, notably regarding the fund management and the profile of investors. Whereas the study suggested public private partnerships, PROESCO is purely a public fund. Despite some difficulties in implementing the fund and problems related to lengthy administrative procedures, it seems that PROESCO will now operate its guarantee mechanism with more efficiency.

In China, the establishment of a guarantee mechanism for EMCos was seen as an important step toward the reduction of the perceived risks related to EE investments. Although no specific action was undertaken in the framework of the 3CEE project, a guarantee fund has been initiated by the World Bank and the GEF in collaboration with the Chinese authorities in 2003.

In India, given that banks would tend to grant loans to end-users and not to ESCOs, and that the ESCO sector is presently relatively limited, the establishment of a guarantee fund makes little sense. The project team concluded that such a fund should only be implemented when the ESCO industry has become sufficiently large and in the position to be able to invest in a large number of projects. In the meantime, ESCOs might use the existing Credit Guarantee Fund Trust for Micro and Small Enterprises managed by SIDBI, although they would still face difficulties in convincing mandated banks to request the guarantee from SIDBI.

Support for equity investment

As planned, reports on issues and options related to equity investment were prepared for each country:

A short study on new approaches for equity investment in Brazil, focusing on hybrid debt/equity and a receivables fund has been developed during the project, but no concrete steps towards the implementation of these instruments was made.

A study to assess equity financing of EMCos was undertaken under the 3CEE project in China. Equity financing usually comes from third-party contributors (parent companies or individuals), reasons for the low amount of private equity financing have been explained earlier in this report.

A similar study was performed in India, and here again, no further steps were taken.

It is difficult to assess the extent to which potential equity providers were approached and what was the issue of these contacts.

Local dissemination

This activity has exceeded the plan indicated in the work plan of the sub-project “Implementation Phase”, as described below:

Brazil

A seminar was organized by ABESCO in 2001 to introduce the 3CEE project to representatives of 7 banks, BNDES and PROCEL. Meetings with banks were held continuously during the project.

An international roundtable on EE was held in Rio de Janeiro in 2002, with the main objective to publicize the 3CEE project, particularly among public authorities (a new federal government was elected in Brazil in 2002 and was inaugurated in January 2003. Major changes in the energy policy were expected; however, these changes did not occur as far as energy efficiency is concerned. Power generation is the government’s priority, while demand-side issues are largely ignored).

In 2003 a seminar addressing ESCOs was held to discuss issues related to EE services with performance contracting. It was organized in collaboration with the USAID BCEEP project and the Canadian GERBI Program. A workshop targeting business planning for ESCO was organized by IBMEC the same year.

ABESCO organized a set of sessions in the Vth Congress on the Energy Business organized by the industrial federation in 2004. Later that year, ABESCO co-organized a Congress on “Energy Efficiency, Distributed Generation and Cogeneration”.

The newly improved website of ABESCO was launched at the end of 2004. It now presents very comprehensive information on energy efficiency issues, events and legislation; it describes the role of ESCOs, the different types of services provided by ESCOs, as well as the possibility for funding EE projects. A special window has been created to introduce PROESCO. Some of the 3CEE project outcomes are available for download, such as the manual for project appraisal. A list of relevant organisations and public bodies is also accessible on the site. The site has developed a restricted access for ABESCO’s member and close partners, where, among other, confidential information related to concrete projects opportunities can be found. It represents a useful source of information for ESCOs, potential and actual ESCOs clients, and for the general public.

The first issue of an electronic newsletter was sent by ABESCO to 250 stakeholders; the mailing list for this newsletter now comprises of 12,000 members. It presents a selection of projects undertaken by Brazilian ESCOs, but also general information related to relevant national legislation and regional or local regulations; case studies from other countries (e.g. USA, Germany, other Latin American countries); an analysis of key issues in the energy sector (e.g. perspectives of the Brazilian power sector, the profitability of energy efficiency, etc.). It provides a list of interesting forthcoming events as well. It is generally very informative, well designed and comprehensive.

ABESCO co-organized a short training course for ESCOs in the framework of the GERBI project.

ABESCO and BNDES each produced a brochure presenting PROESCO, the guarantee fund for ESCOs.

China

In 2003, a meeting was held to discuss a pilot project between a large petroleum company and an EMCo. The project was eventually abandoned by the end of 2003, although no reason has been provided in the documents consulted by the evaluator.

Training sessions were organized by the Chinese core group (EMCA) addressing banks, ESCOs and financial institutions, in cooperation with the implementing agency for the World Bank/GEF guarantee fund project. 150 people were reached in 2005.

There was no systematic information activities designed to target the industry on a large scale.

India

The Confederation of Indian Industries compiled a manual on EE opportunities in various industries. It is unclear however whether this publication can be attributed to the 3CEE project.

Several workshops were conducted during the project, targeting banks equipment suppliers, and ESCOs: in Delhi in 2003, a meeting between the different stakeholders was organized to discuss EE projects financing; feedback from the China mini exchange for ESCOs in Mumbai in 2003; discussion of the 3CEE project findings in Mumbai in 2005.

A number of training courses for bank personnel and awareness workshops for the industry were proposed in collaboration with the World Bank/GEF projects.

IREDA produced a brochure introducing the different financing schemes implemented by the Indian Banks.

Cross exchange workshops

The cross-exchange workshops were organized as foreseen in the work plan of the sub-project "Implementation Phase". A final conference was also held at the end of the project. The proceedings of all meetings hereby listed are available on the 3CEE project website:

- Developing Financial Intermediation Mechanisms for Energy Efficiency Projects – Focus on Commercial Banking Windows for Energy Efficiency. Goa, India, 2001.
- Second International Cross-Exchange on Commercial Banking Finance for Energy Efficiency. Angra dos Reis, Brazil, 2004.

- Workshop on ESCOs and Equity Financing. Beijing, China, 2005
- Workshop on Energy Efficiency Banking and Guarantee Facilities. New Delhi, India
- International Conference on Financial Intermediation Mechanisms. Paris, France, 2006.
- An ESCO Mini Exchange in Beijing, China in 2004.

3.4 Catalytic Role

The project's main achievement in terms of potential replication lies in the gaps identified during the implementation of the activities, particularly as far as scaling up is concerned. Since the 3CEE interacted with many convergent and complementary initiatives, it was sometimes very difficult to differentiate the projects results from the achievements of other programs or projects, particularly because the national implementing organizations were often the same. The most relevant of these initiatives are described below:

- The core group of the 3CEE originally stem from the BCEEP project (Brazilian Clean and Efficient Energy Program), supported by USAID, which was initiated in 2001. The project main component was to establish a dialogue between ESCOs and financial institutions.
- GERBI project: the Greenhouse gas Emission Reduction in Brazilian Industry project, supported by Canadian bilateral cooperation, started in 2002. It focused on qualifying ESCOs to develop performance contracts for EE in industry, emphasizing thermal applications and large projects to justify the transaction costs for obtaining carbon credits. It also included relations with industry associations, training of plant managers and the involvement of the financial sector to facilitate the provision of financing for projects. The project also contributed in the preparation of project appraisal guidelines for PROESCO. ABESCO participated in the program, namely to organize training for ESCOs.
- World Bank's Energy Efficiency on-lending Facility in China: this fund, supported by the GEF, was to be created to address the risks associated with large EE project lending. The original design of the facility included 5 components: (1) a dedicated World Bank loan to finance large scale EE investments through financial intermediary lending; (2) technical assistance for domestic banks to establish EE financing businesses and develop project pipelines; (3) technical assistance for 2-3 energy intensive industries for the preparation of large-scale demonstration projects; (4) technical assistance to the government for establishing a regulatory environment conducive to large-scale EE financing; (5) project management, monitoring and reporting. (To date, no further information on the effective implementation of this facility was provided. Further contacts with the World Bank should provide additional information by the time of completion of the evaluation).
- World Bank/GEF China Energy Conservation project: initiated in 1998, this project led to the creation of 3 pilot EMCos. The second phase of this project started in 2003, with the aim to promoting the development of more EMCos and to establish a sustainable EMCo industry, mainly through the establishment of an EMCo Loan Guarantee Special Fund. Until 2006, 23 EMCos have been granted guarantees on loans, covering 52 projects
- Another World Bank/GEF project was implemented in India to provide support in financing EE projects. Its focus was energy audits and certification of auditors. Training was provided to several hundred auditors; the project provided financial support for the industry to perform energy audits. It ended in March 2008.

In the evaluator's view, recommendations issued by the project team on the basis of the lessons learnt in the three countries may have some potential for application in other regions and countries. This mostly concerns the most appropriate approach to choose when implementing EE financing issues in a specific region/country to avoid designing inadequate instruments. It draws conclusions on the key issues to be addressed: precise diagnosis of the national conditions to design the project activities; dialogue between the financing community and the EE promotion sector; strategic reviews of the sector priorities.

3.5 Monitoring and evaluation system

3.5.1 M&E design

Apart from progress reports, no real monitoring and evaluation plan has been included in any of the sub-project documents. A column for M&E was included in the document for in-country activities, but it remained extremely vague in terms of monitoring tools and adjustments mechanisms. The combined project documents did not meet the minimum requirements for the design and implementation of the M&E as described in Annex 4 of the evaluation ToRs. No proper SMART indicators for project implementation and results were to be found. Likewise, there was no mention of the reviews and evaluations to be undertaken within the project framework. No detailed budget was provided either.

3.5.2 M&E plan implementation

In absence of a proper M&E plan, the evaluation of its implementation became a moot point. While M&E was not required within the project design stage, it is clear that M&E makes-up for management best practices and should have been included or taken into consideration at both project design stage and during project execution. However, the Brazilian country report mentioned that the World Bank project coordinator met the national core group secretariat and the consultants to update and modify the work plan according to new development in the project course. No more details were provided on the contents and extent of such changes. There is no indication of similar activities in the China and India country reports. In practice, it seems that national working programs were revised on a yearly basis, recording changes in activities when applicable. The evaluator did not have access to any of these programs.

Two progress reports, for 2005 and 2006, as well as the final report, were provided to the evaluator, whereas 6 progress reports should have been produced. Apart from being extremely short (6, 7 and 9 pages respectively) these reports brought only limited information on the products and outcomes, being rather vague in the description of activities or the quality of the outputs.

3.5.3 Budgeting and funding for M&E activities

The detailed project budget included no specific line for M&E activities, which is consistent with the quasi absence of an M&E plan. The final evaluation only had been budgeted in the project documents.

3.5.4 Long-term monitoring

No provision has been made for long-term monitoring; the final report does not include any indication to that extent.

3.6 Preparation and readiness

The project objectives and components were clearly ambitious from the start, but fairly clear in the 3 sub-project documents. The logical frameworks, however, were often imprecise, lacking details on the quality and quantity of outputs and products expected from the project. The distribution of work among the different institutions was precise, and the responsibilities of each agency adequately described.

It is unclear whether lessons from other projects were considered in the design of the 3CEE project.

The national counterparts and stakeholders to be involved in the projects had been identified during the planning phase and should have been confirmed after project launch. There was very little mention of profile and responsibilities for them in the project documents. In India, a preliminary mission reported on the profile of the most appropriate stakeholders, while in Brazil and China, the national members of the core groups were identified on the basis of previous initiatives led by the World Bank or bi-lateral cooperation (as described in Section 3.4). However, activities, project management and coordination responsibilities were divided between UCCEE, in charge of cross-country activities, and the World Bank, responsible for the in-country activities.

3.7 Country Ownership

Overall, it can be noted that national stakeholders, particularly the financial sector and to some extent ESCOs in Brazil and China, clearly benefited from the 3CEE project in terms of increased awareness, better knowledge of critical issues related to EE financing, and mutual understanding.

The project document did not include any action to involve the governments of the three countries, considering that the main project objective was to support financial institutions in extending loans for investing in energy efficiency. However, it mentioned that interested government officials would be involved in the countries core groups to “serve in an advisory fashion”. As can be seen in §3.3, no public authority (e.g. ministries) was participating in the core groups in China and India, although in the three countries, some banks were public sector banks (all of them in India). Despite the involvement of the Brazilian Federal Ministry of Mines and Energy in the core group, and the presentation of the project to the newly elected officials in 2002, its role does not appear significant in the project in Brazil either. In China, although the national government is clearly aware of climate change issues and is determined to mitigate greenhouse gas emissions, it does not seem that public authorities were much involved in the project. They are however committed to improve energy efficiency as can be seen by their involvement in the World Bank/GEF project on guarantee fund for EMCos. In India, it seems that the Bureau of Energy Efficiency, acting as the national energy agency, is very much aware of the need to encourage initiatives that might increase energy efficiency, and is acting to develop and promote ESCOs.

3.8 Stakeholder participation / public awareness

Stakeholders’ participation constituted one of the main characteristics of the 3CEE and was successfully implemented. Banks and ESCOs were involved in the core groups of each country. This guaranteed that they participated in strategic decisions regarding the orientation of some activities, that they received continuous information on the project outcomes and benefited from exchange of knowledge between the different stakeholder groups. One limitation could be noted in China, where representatives of banks present in the core group

did not have the authority to take decisions or to influence their hierarchy in adopting the proposed financial intermediation instruments.

The collaboration between stakeholders, project partners and institutions is a strong feature of the project, and was part of the project design. The successful interactions at the national as well as at the cross-country levels are considered as one of the most positive project outcomes. As mentioned by interviewees in Brazil, it allowed them to better understand each other's difficulties in dealing with financing EE projects. In India, it made bankers enthusiastic about energy issues. Cross-country activities also encouraged exchange of experiences, and initiated new business avenues for an Indian ESCO. A Brazilian stakeholder mentioned that it would have been fruitful to get benchmarking on these issues from other regions and countries, since the three countries targeted in the projects, although having widely different political, economic and financial conditions, ultimately faced similar barriers and difficulties.

Awareness activities were mostly focused on banks, ESCOs and selected industry branches in selected provinces/regions. In India, these regions and industries were chosen on the basis of the existence of "projects uptech" as defined by SBI (see §3.1.1). In Brazil, ABESCO selected regions where SMEs occupied a large share of the economic activity; the first areas to be chosen were by commodity situated in the State of Sao Paulo (where ABESCO is located), but new industry sectors and other states appear on the association's agenda for the future. The project activities undeniably increased awareness within these groups, but some important gaps remained (as described in Chapter VI) particularly amongst the industrial sector in all of the three countries, but also within the financial sector in China.

3.9 Financial planning

Few documents relating to financial planning or reporting were provided to the evaluator; in fact only the final financial report was available. To the evaluator's knowledge, there was no financial audit performed so far to be used to assess if due diligence in the management of the funds has been observed. Discussions with the World Bank project coordinator and with staff at UCCEE brought some clarifications on differences between the foreseen budget and the actual expenditure.

The assessment of the project financial aspects was complicated due to the fact that the financial information is not coherent between the project documents and the financial final report.

For the World Bank component, the data presented in the project documents sensibly differs from the data recorded in the final report. In particular, the total budget for each category of costs given in the final report is substantially different from the total costs of the same categories in the project summary document. These differences are listed in the table below:

Table 1: Expenditure discrepancies (USD)

UNEP Codes	Cost category	Budget planned World Bank Component		Actual expenditure World Bank component (Financial final report)
		Project document	Financial final report	
1101	World Bank experts	60,000	135,000	129,406
1201	World Bank consultants	75,000	275,000	301,753
1202	In-country support consultants	840,000	760,000	654,694
1301	Administrative support	65,000	0	65,650
1601	World Bank mission	56,000	46,000	42,019

	travel			
3300	Dissemination	120,000	0	4,814
		1,216,000	1,216,000	1,198,336

There is no information to explain the discrepancies of the planned budget between the two documents. However, and given that the project lasted four years, the comparison between the total budget and the actual expenditure as presented in the final report shows rather limited differences. The main change relates to administrative support, whose amount is coherent with the budget planned for this cost in the project document.

For the UCCEE component, there are no major differences between the planned budget in the project summary and the budget indicated in the financial final report, apart from an amount of US\$23,000 for contractual services that figured only in the report. On the contrary, some significant discrepancies can be noted between the total budget and the actual expenditure related in the final report: approximately US\$68,000 more were spent for the line “UCCEE expert” than foreseen; US\$64,000 more for contractual services and in-country consultants; while only half of the budget for a consultant was used; only 37% of the travel costs were spent, which can be explained by the use of other projects travel budget. 80% of the budget for the workshop and dissemination were spent. These changes can be explained by the unexpected amount of coordination required for the preparation of the workshops and related cross-country activities.

As for the UNEP component, the information provided in the project summary vastly differs from both the expected budget and the actual expenditure presented in the final report. These two last sets of figures are also quite different.

Furthermore, the project duration was foreseen to be three years (2002-2004) in the project documents, but project activities generated expenditures until 2007. The analysis of available data shows that most activities actually started a few months to a year later than planned. During the first year (2002) no budget was spent by the World Bank and very little by the other two agencies, which is relatively normal since the project started in November that year. However, the tables presented in the project documents had not been amended despite the fact that the starting date mentioned was correct.

The project final actual costs, extracted from the final financial report, are summarized in the following table:

Table 2: 3CEE Project final actual costs

World Bank component		UCCEE component		UNEP component	
Cost category	Expenditure	Cost category	Expenditure	Cost category	Expenditure
World Bank experts	129,406	UCCEE expert	231,946	UNEP energy program officer	45,000
World Bank consultants	301,753	Consultant		Consultants	38,227
In-country support consultants	654,694	In-country consultants	113,498	Sub-contracting	23,500

Administrative support	65,650			Data processing and communication	9,000
World Bank mission travel	42,019	UCCEE mission travels	29,226	UNEP staff travel	1
Dissemination	4,814	Training / workshops	323,407	Reporting	68
<i>Total</i>	<i>1,198,336</i>	<i>Total</i>	<i>696,077</i>	<i>Total</i>	<i>106,736</i>
Programme support costs	59,917	Programme support costs	34,904	Programme support costs	5,340
TOTAL	1,258,252	TOTAL	731,081	TOTAL	112,136

3.10 Implementation approach

The project implementation mechanisms outlined in the project document have been closely followed. The project management and coordination, as well as the in-country activities, were under the responsibility of the World Bank, while UCCEE was in charge of the cross-country activities. UNEP's involvement was limited to overall supervision, but necessary for administrative reasons. Within each country, the core group secretariats were responsible for the daily implementation of the project activities agreed in the project document and subsequently the yearly work plans. Although the World Bank was in charge of contracting international and national consultants, they left the responsibility for the elaboration of terms of reference for specific activities to be sub-contracted and the selection of national experts to the core group secretariat. This was a practical way to save time and resources.

It seems that the arrangement worked reasonably well, despite changes of the core group secretariat in Brazil and China which occasioned delays and modifications in the work programs. Notwithstanding the formal organisation indicated earlier, both agencies have participated to some extent in all project activities: the World Bank staff and consultants attended the cross-country activities, and UCCEE was informed of the in-country activities. According to the World Bank and UCCEE staff, the work load for the two agencies has been seriously underestimated in the project document, which is reflected by the actual expenditure (see §3.9).

Overall, it can be said that the project implementation was well designed and the project executed according to plan. Given the complexity of the project, spreading in three different countries, project management can be considered rather effective and efficient.

3.11 UNEP supervision and back-stopping

This assessment is essentially based on interviews, since very little correspondence has been made available to the evaluator. In any case, analysing mails and correspondence for a multi-country project that lasted 4 years would require enormous amounts of time. The main finding here is that UCCEE seems to have played a major role in the project supervision on behalf of UNEP/DTIE, and that UNEP's involvement has been less than expected. According to the project documents, UNEP was to share responsibility of the organisation of the final conference with UCCEE, and to be in charge of reporting. National reports have been prepared by the core group secretariat and the World Bank consultants, while UNEP elaborated the formal progress reports.

IV. Conclusions and Rating

The ambitious goals of the 3CEE project have been partially achieved; some activities have been implemented with more success than others. The main gap appearing during this evaluation concerns the lack of monitoring regarding the volume of investment attributed to the project, as well as the number of projects directly developed. It is therefore extremely difficult to assess the project impacts on greenhouse gas emissions reduction. Furthermore, the lack of proper project M&E did not allow the project management to identify this aspect and correct it within the project time frame.

Another difficulty came from the imprecise report on the activities pertaining to this project and those supported by other initiatives, particularly in Brazil and India, where for example a number of training and awareness actions, were conducted in collaboration with other donors and institutions, and with the same counterpart at the national level.

In spite of these limitations, the overall performance, in terms of achievement of planned outputs and activities, can be rated from moderately satisfactory to satisfactory. The core groups were formed as planned and despite some changes and shortcomings, seem to have worked efficiently. The second activity, “commercial banking window”, met mitigated results, but apart from the case of China, can be considered as successful. The development and promotion of ESCOs was mostly positive in Brazil, whereas in China and India, results are clearly limited. The adoption of guarantee mechanisms, directly in Brazil and indirectly in China, can be considered as extremely positive. Support for equity investment remained entirely open; the project having delivered national studies but not following up on results. Local dissemination could have been developed further, but is rated as being satisfactory, particularly in Brazil and India. Finally the cross-country workshops managed to reach their purpose, i.e. developing exchanges of experience between stakeholders of the three countries.

The project clearly raised important issues related to the definition of financial mechanisms and ESCOs market development that were not totally solved by the time the project ended. It seemed however to have a significant impact in terms of stimulating new initiatives to continue the efforts initiated by the 3CEE project, as can be seen in China with the on-lending facility and the guarantee fund for EMCos.

Given that the project’s main achievement is the increased awareness of domestic financial institutions, at least in Brazil and India, financing EE projects in these two countries are now well under way and banks will continue to operate either via their dedicated credit lines or will open their existing products to energy efficiency. Issues such as ESCOs development and the introduction of supporting policy measures remain open.

The ratings of the 11 evaluation criteria are presented in the following table. Brief comments are provided to support the rating for each sub-criterion. The overall rating for the 3CEE project is moderately satisfactory. Since a few criteria could not be evaluated at this stage, the overall rating could be slightly modified at the end of the evaluation.

Overall Ratings Table

Criterion	Evaluator's Summary Comments	Evaluator Rating	EOU rating
K. Attainment of project objectives and results (overall rating) Sub criteria (below)	Globally, despite some shortcomings, the project managed to achieve some concrete results and most of the stated objectives.	MS	EOU agrees with the evaluator MS
A. 1. Effectiveness	Most project objectives have been achieved, particularly regarding the capacity of local stakeholders to support EE projects and in increasing the financial sector awareness, at least in Brazil and India. Limited results in China. The overall EE policy and specific conditions was sometimes overlooked. Long-term impacts difficult to assess due to lack of investments monitoring.	MS	
A. 2. Relevance	The project outcomes are consistent with UNEP's mission and goals and with countries priorities.	S	
A. 3. Efficiency	The project was extremely labour intensive; some activities were not as successful as planned despite the effort involved.	MU	
B. Sustainability of Project outcomes (overall rating) Sub criteria (below)	The project outcomes should generally have a sustainable impact financially. Institutional, legal and policy frameworks were not sufficiently taken into account. No adverse environmental impacts are foreseen; contribution to GHG emissions reduction could not be quantified due to lack of data.	MS	EOU agrees with the evaluator MS
B. 1. Financial	National financial institutions in Brazil and India likely to pursue their lending for EE projects. Support for ESCOs should be continued in Brazil and China, less likely in India.	S	
B. 2. Socio Political	The socio-political factors widely differ in the 3 countries, where Brazil has the least political commitment to EE. Awareness to EE issues is in general very low.	MS	
B. 3. Institutional framework and	Little attention has been paid to institutional framework and	MU	

Criterion	Evaluator's Summary Comments	Evaluator Rating	EOU rating
governance	governance both at design and implementation phases.		
B. 4. Environmental	Given the lack of monitoring regarding the volume and number of EE projects financed through mechanisms developed by the 3CEE project, it is difficult to assess its environmental impacts. However, it is clear that any EE investment will lead to GHG emissions reduction.	MS	
C. Achievement of outputs and activities	Most activities were implemented as planned, with a few notable exceptions, especially in China. Some results are limited in terms of the production of immediate outputs, especially in China. But real intermediation mechanisms could be adopted in Brazil and India.	MS	EOU agrees with the evaluator MS
D. Monitoring and Evaluation (overall rating) Sub criteria (below)	Overall, the M&E were limited to the production of short progress reports and final report.	MU	Management best practice requires monitoring process including Progress Reports to be more detailed and comprehensive MS
D. 1. M&E Design	The M&E plan was incomplete and lacking precise indicators.	MU	
D. 2. M&E Plan Implementation (use for adaptive management)	Limited information regarding changes of orientation during the project was provided in reports.	MU	
D. 3. Budgeting and Funding for M&E activities	No specific budget planned.	MU	
E. Catalytic Role	Collaboration with other initiatives was implemented, but the differentiation between their respective activities and outputs was sometimes difficult to assess. Lessons from the 3CEE project encouraged the adoption of new mechanisms, particularly in China.	S	EOU agrees with the evaluator S

Criterion	Evaluator's Summary Comments	Evaluator Rating	EOU rating
F. Preparation and readiness	The project objectives and components were fairly presented in project documents, but logical frameworks lacked detailed and important information.	MS	EOU agrees with the evaluator MS
G. Country ownership / drivenness	Limited involvement of public authorities in the 3 countries.	MS	EOU agrees with the evaluator MS
H. Stakeholders involvement	Very strong involvement of stakeholders, especially banks and ESCOs, to be nuanced by country.	S	EOU agrees with the evaluator S
I. Financial planning	There are some inconsistencies and discrepancies between the budget described in the project documents and the budget indicated in the financial final report, as well as with the actual expenditure.	MS	EOU agrees with the evaluator MS
J. Implementation approach	The implementation mechanisms and project management arrangement were rather effective and followed the plan.	S	EOU agrees with the evaluator S
K. UNEP Supervision and backstopping	UNEP seems to have delegated part of its responsibility to UCCEE; progress and final reports lack important information.	MS	EOU agrees with the evaluator MS
Overall		MS	MS

RATING OF PROJECT OBJECTIVES AND RESULTS

Highly Satisfactory (HS): The project had no shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Satisfactory (S): The project had minor shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Moderately Satisfactory (MS): The project had moderate shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Moderately Unsatisfactory (MU): The project had significant shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Unsatisfactory (U) The project had major shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Highly Unsatisfactory (HU): The project had severe shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

V Lessons learnt

An important conclusion derived from the 3CEE project is that the financial sector can be convinced that supporting energy efficiency project is a profitable business and that it has a significant potential in terms of opening new opportunities and attracting new clients. The fact that banks in Brazil and India now consider EE projects like any other investment is a real achievement.

The creation of a dialogue between the various national stakeholders is another positive achievement. It helped creating institutional and personal relations that should ensure the sustainability of EE financing. The mitigated results in China, however, show that the right level of decision-makers should be targeted to bring significant outcomes. Institutional issues within the financing institutions should be clearly reviewed to ensure that appropriate measures can be implemented.

The project focused on EE project development in the industry led to bypass the opportunities represented by the large energy saving potential in the public sector, which probably constitutes the largest market for ESCOs, particularly in Brazil and India.

This focus also led to partially underestimate the importance of policy and legal frameworks in facilitating the conditions for implementing commercial lending mechanisms and creating a market. Without a strong regulation and incentives, existing financing facilities might not have sufficient leverage to encourage private companies to undertake energy efficiency measures.

VI Recommendations

As this is a terminal evaluation and the project has ended, recommendations at this stage would have little influence on the project outcomes and could only benefit initiatives to be supported in the future.

Given the weaknesses of the monitoring of the 3CEE project activities and outcomes, and the general lack of monitoring and evaluation system, it is recommended that special attention should be given in the future to these issues in the project design phase. Furthermore, for multi-country projects having a duration of at least 3 years, it would be useful to contract an external expert to conduct a mid-term evaluation in order to draw attention to possible shortcomings and weaknesses in the implementation of the project; thus providing time and space to make appropriate corrections.

The lack of monitoring of their investments in energy efficiency by banks rendered any assessment of the project impacts in terms of climate change issues impossible. It is thus crucial, when designing financial instruments, to include appropriate monitoring tools in order to obtain a clear picture of the volume of investments, the foreseen energy savings, and the corresponding GHG emissions reduction. Concrete and quantifiable results in terms of climate change effects mitigation could also be presented as a marketing tool for financial institutions by developing market niches and consequently attract an entirely new clientele.

In order to consolidate the 3CEE project results and to encourage similar initiatives in the three countries, the evaluator has made some suggestions to overcome remaining barriers to the adoption of financial mechanisms to support EE projects. However, since the 3CEE project is now closed, these recommendations are mostly addressed to national stakeholders and the international community for further action.

Brazil

- Gaps in the national energy policy: a supportive energy policy is crucial for creating a favourable environment allowing the development of energy efficiency initiatives. In Brazil, the energy policy mostly considers issues related to power generation and the production of bio-fuels, largely ignoring issues related to the demand for energy. Energy efficiency is not properly addressed, the relevant regulation (especially regarding building codes, energy auditing, voluntary agreements) is incomplete, and the taxation system does not encourage the implementation of energy saving measures by the industry or the building sector.
 - *Recommendation: enhance the dialogue with federal authorities for the elaboration of an Energy Efficiency Action Plan in Brazil, to set concrete targets in terms of greenhouse gas emissions reduction in the different sectors of the economy, to suggest policy, institutional, legal, tax, and awareness measures, and to assess the available sources of funding for the implementation of these measures.*
- Capacity of ESCOs to develop contracts: despite the activities developed by the 3CEE project in this field, most Brazilian ESCOs still lack the capacity, whether technical, legal or financial to expand their business beyond 10 to 15% of their present business. Given the size of the potential market for ESCOs in Brazil, both in the industry and public sector, additional support would be needed to assist ESCOs in increasing their volume of investment and the number of projects they are able to implement.
 - *Recommendation: support to ABESCO in developing training schemes for ESCOs, encourage initiatives such as pooling of resources and projects bundling.*
- Public procurement law: public institutions still consider costs as the most important criterion when purchasing equipment, works or services, in detriment to environmental criteria.
 - *Recommendation: publish a guide to encourage public bodies to integrate environmental criteria in their procurement procedures; this guide, including case studies, eligible criteria, benefits, sources of information, etc. could be produced taking into account the experience realized in 5 European cities between 2002 and 2004 (Project PROMISE – “Procurement in Municipalities for Integrative Solutions on Energy”, supported by the European Commission) where pilot projects demonstrated the possible use of existing legislation to enforce energy considerations in public procurement.*
- Lack of awareness among energy users: there is a general low level of awareness regarding energy conservation in the industry, as well as in the commercial, public or residential sectors. Despite some drastic events, such as the power cuts and subsequent rationing in Sao Paulo a few years ago, that demonstrated that energy is not unlimited, the general awareness related to energy conservation remains very low. Additionally, a substantial part of the power distributed is being used illegally, both in the residential and industry/commerce sector, thus rendering incentives to save energy rather pointless.
 - *Recommendations: according to the measures identified in the National Action Plan suggested above, organize national campaign for energy efficiency, targeting specific sectors, such as industry, offices and commerce. Launch a national information campaign to raise the awareness of energy consumers in the residential sector.*
Enforce payment of power bills, particularly by industrial and commercial clients.

India

In order to increase the impact of the positive environment created by the 3CEE project, additional measures should be implemented in India, such as:

- Energy audits: the current legislation foresees a compulsory audit for energy intensive companies. In practice, auditing is usually requested before a bank loan can be attributed, even to a small enterprise. Other controlling tools are used by banks to ensure the viability of the companies requesting loans; for example, SIDBI requires the presentation of a certificate elaborated by the regional pollution control boards to assess whether SMEs do not reach a critical level of pollutant emissions. A project supported by the GEF and implemented by the World Bank funded energy audits in SMEs, covering half of the audit tariff. The project was completed in April 2008, and the support scheme stopped with the end of the project. Over 5,000 energy auditors were trained in the last 3 years; the training and certification of auditors was also undertaken by this GEF/World Bank project.
 - *Recommendation: encourage the industry to perform energy audits by implementing a support system, e.g. through tax rebates or exemption.*
- Public procurement law: according to the Bureau of Energy Efficiency (BEE), changes to include life cycle costs in the prices of goods and services tendered by the public sector should be introduced in the next couple of years. This should encourage public authorities to adopt more efficient technologies and practices in the future.
- Banks procedures simplification: ESCOs in India expressed their concerns about the length and costs related to the financing of energy efficiency projects, regardless of their size. Even in case of project bundling, bank appraisal is complex and transaction costs remain high.
 - *Recommendation: further develop the banks capacity in assessing energy efficiency projects by training and lightening their procedures. Make use of SIDBI guarantee fund.*
- ESCOs capacity to develop market niches: as analyzed earlier, there are only a few ESCOs operating in India; they have only a limited capacity, both technical and financial, to manage a significant volume of projects.
 - *Recommendation: BEE should encourage the creation of ESCOs through support for training of energy specialists and legal expertise.*
- Target the public sector: this is the most accessible market for ESCOs in India. The potential for energy savings is considerable in this sector, and it is the most open to ESCOs operation.
 - *Recommendation: BEE should make a survey of the public building stock and the potential for energy savings.*
- Lack of energy efficiency targets: there are no real national targets for energy efficiency; there is currently a goal set by the government to avoid the installation of 10,000 MW of new capacity by 2012, which represents 5% of the present installed capacity.
 - *Recommendation: specific energy saving targets, particularly for the industry and public sector, should be set by national authorities.*

China

- Positive policy context: in China, the government is acutely aware of climate change issues and is deploying tremendous efforts to abate greenhouse gas emissions. In this context, the national authorities are ready to welcome initiatives able to make significant improvements in energy efficiency.
 - *Recommendation: international organizations should support China in setting targets for energy efficiency in both the industry and the public sector, and in identifying policy and strategy measures to reach these targets.*
- Lack of awareness among financing institutions: the 3CEE project showed that to convince banks of the necessity to develop specific mechanisms for financing EE projects in China, a strong and ambitious approach is needed. In particular, high-level decision-makers should be targeted to ensure an effective implementation of project activities; initiatives to set up specific department within banks, dedicated to the management of EE investments, should be encouraged.
- EMCos development is still fragile: EMCos still lack the capacity to convince financing institutions by developing their know-how in terms of business plan preparation, financing control, etc.
 - *Recommendation: provide support to EMCos through training and certification.*

Annex 1. List of persons interviewed

Name	Organisation/Position,
Brazil	(meetings)
Maria-Cecilia Amaral	ABESCO, Executive Director
Armando	ABESCO/RINEN, General Director
Linda Murasawa	Banco Real, Vice-President, Environment & Social Products
Alvaro Augusto da Silveira Jr	Banco Real, Superintendente
Denise Gilbran Nogueira	Banco Itaú, Responsible for Environment & Social Products
Glenia Silva de Deus	Banco Itaú, Sustainability and Internal Communication Dpt.
Neyson Sarmento	Banco do Brasil, Senior Analyst
Eduardo Bandeira de Mello	BNDES, Head of Environment Dpt.
Mauro Araujo Almeida	BNDES, Engineer
Alvaro Ferreira	BNDES, Administrator
Luis Eduardo Alves de Lima	Climate Change Capital, Adviser (former 3CEE project expert)
Christiane Tavares	Banco Itaú, Actifs BNDES
Isaura Maria de Rezende Lopes Frondizi	FIDES, main Shareholder
Dora Pereira	Ecoenergy, Controller
India	(meetings)
Debashish Majumbar	IREDA, Chairman & Managing Director
A.A. Khatana	IREDA, Chief General Manager, Technical Services
Debjani Bhatia	IREDA, Manager
Koshy Cherail	Conzerv, Consultant
E.S. Balasubramian	Conzerv, General Manager
G.C. Datta Roy	DSCL Energy Services, Chief Executive
Sonalal Datta	State Bank of India, Ass. General Manager
Ajay Mathur	Bureau of Energy Efficiency, Director General
U.J. Lalwani	SIDBI, General Manager
O.S. Vinod	SIDBI, CEO Credit Guarantee Fund Trust for Micro and Small Enterprises
UNEP	(telephone)
Mark Radka	UNEP/DTIE, Chief Energy Branch
Jyoti Painyuli	UCCEE-Risoe Centre Denmark, Project Coordinator India
Juan Zak	UCCEE-Risoe Centre Denmark, Project Coordinator Brazil
World Bank	(telephone)
Robert Taylor	World Bank, overall Project Coordinator, Project Coordinator for China
Jeremy Levin	Project Coordinator for India

Annex 2. Documents Reviewed

Sub-project Summaries

- Developing Intermediation Mechanisms for Energy Efficiency Projects in Brazil, China and India: In-country Activities
- Developing Intermediation Mechanisms for Energy Efficiency Projects in Brazil, China and India: UCCEE participation, In-country Activities
- Developing Intermediation Mechanisms for Energy Efficiency Projects in Brazil, China and India: World Bank Component
- Developing Intermediation Mechanisms for Energy Efficiency Projects in Brazil, China and India: Implementation Phase

Project Reports

- Brazil Country Report
- Brazil Country Report, Executive Summary
- India Country Report
- China Country Report
- 3CEE Final Report
- Financing Energy Efficiency – Lessons from Recent Experience with a focus on Brazil, China and India
- Financing Energy Efficiency – Lessons from Brazil, China, India and Beyond

Country Documents

- Opportunities and Challenges in the Development of Financial Intermediation Mechanisms for Energy Efficiency Projects in Brazil
- Financing Energy Efficiency Projects in Brazil
- A Financial Model for Evaluating Projects with Performance Contracts – Report to the Energy Efficiency Financial Task Force
- Analysis of the Viability and Design of a Guarantee Facility for Energy Efficiency Projects (Brazil)
- Energy Efficiency and R&D Activities in Brazil: Experience from the Wire-charge Mechanism (1998-2004)
- Diretrizes Orientativas para Concepcao de Projetos de Eficiência Energética
- Equity Capital Investments in China's Energy Efficiency Sector
- India Mission Report, May 2001
- Risk Analysis and Follow-up Definition of Possible India Guarantee Fund Requirements, Mechanisms and Potential Key Features
- Manual to Appraise Energy Efficiency Projects (India)
- Energy Efficiency Case Studies in Indian Industries
- Final Report for Energy Efficiency Gaps and Strategy study (India)
- Designing Financial Structures and Financing Instruments for Energy Efficiency Projects in India
- Development of Energy Efficiency Projects in the Glass Cluster at Firozabad, Uttar Pradesh, India

- Development of Energy Efficiency Projects in SME Paper Cluster in the States of Punjab, Haryana, Uttaranchal
- Developing Financial Intermediation Mechanisms for Energy Efficiency Projects in the Steel Re-rolling Cluster at Mandi Gobindgarh, Punjab, India

Events Proceedings/Summaries

- Indian Participation in ESCO Mini Exchange in China and Local Dissemination Activities in India
- Developing Financial Intermediation Mechanisms for Energy Efficiency Projects – Focus on Commercial Banking Windows for Energy Efficiency. Workshop Summary, Goa, India
- Second International Cross-Exchange on Commercial Banking Finance for Energy Efficiency. Workshop Summary, Angra dos Reis, Brazil
- Workshop on ESCOs and Equity Financing. Workshop, Beijing, China
- Workshop on Energy Efficiency Banking and Guarantee Facilities. Workshop Summary, New Delhi, India
- International Conference on Financial Intermediation Mechanisms. Presentations, Paris, France

Financial Documents

- 3CEE Final Financial Report

Other Documents

- Progress Report on the Loan Guarantee Component of the World Bank/GEF Phase II China Energy Conservation Project
- The Action Plan for Energy Efficiency (India)
- PROESCO, Financiamento gerando Eficiência Energética. Brochure ABESCO
- 4 Invitation brochures for Regional Energy Efficiency Fora for industries: Ribeirão Preto/Sertãozinho/Franca; Rio Claro/Americana/Lineira/Santa Bárbara do Oeste; São Carlos/Araraquara/Matão; São José do Rio Preto/Presidente Prudente/Araçatuba/Birigui, ABESCO
- Energy Efficiency Financing Schemes of Indian Banks, leaflet, IREDA

Annex 3. Websites consulted

Project website

<http://3countryee.org>

Other websites of interest

<http://www.eficienciaenergetica.org.br>

<http://www.bee-india.nic.in>

<http://www.ireda.in>

<http://www.unep.org>

<http://www.worldbank.org>

<http://www.bnds.gov.br>

<http://www.ecoenergy.com>

Annex 4. Terminal Evaluation – Terms of Reference

2.1. Objective and Scope of the Evaluation

The evaluation shall be conducted as an in-depth evaluation. The objective of the evaluation is to establish project impact, and review and evaluate the extent to which implementation of planned project activities and outputs have been accomplished. The evaluation shall determine the extent to which the project has been successful in fulfilling its objectives and obtaining the expected results and whether it has been cost effective in producing its results.

The evaluation will cover all key activities undertaken within the framework of the project as described in the project document. The evaluator will compare planned outputs of the project with actual outputs and assess the actual results to determine the impact of the project. The evaluation will answer the following key questions:

- a) To what extent has the project helped to foster the further development of EE project packaging capacity in the domestic financial sectors and ESCOs in Brazil, China and India?
- b) Determine how and the extent by which this project has helped the three countries realizing their potential for greenhouse gas emissions reduction from EE projects?

2.2. Methods

This terminal evaluation will be conducted as an in-depth evaluation using a participatory approach whereby the UNEP/EOU, UNEP Project Manager, key representatives of the executing agencies and other relevant staff are kept informed and regularly consulted throughout the evaluation. The consultant will liaise with the UNEP/EOU and the UNEP/DTIE Project Manager on any logistic and/or methodological issues to properly conduct the review in as independent a way as possible, given the circumstances and resources offered. The draft report will be circulated to UNEP/DTIE Project Manager, key representatives of the executing agencies and the UNEP/EOU. Any comments or responses to the draft report will be sent to UNEP/EOU for collation and the consultant will be advised of any necessary revisions.

The findings of the evaluation will be based on the following:

- a) *Desk review of project documents, output, half-yearly progress reports, monthly financial reports, terminal report, minutes of meetings and relevant correspondence.*
- b) *Review of specific products including publications, management and action plans, database and web-site updates*
- c) *Telephone interviews with relevant UNEP/DTIE project manager and Fund Management Officer, and other relevant staff in UNEP dealing with renewable energy related activities as necessary.*
- d) *Telephone and personal interviews with relevant stakeholders involved including the Steering Committee, the two banks and the Insurance Association.*

Key Evaluation principles.

In attempting to evaluate any outcomes and impacts that the project may have achieved, evaluators should remember that the project's performance should be assessed by considering the difference between the answers to two simple questions “*what happened?*” and “*what would have happened anyway?*”. These questions imply that there should be consideration of the baseline conditions and trends in relation to the intended project outcomes and impacts. In addition it implies that there should be plausible evidence to attribute such outcomes and impacts to the actions of the project.

Sometimes, adequate information on baseline conditions and trends is lacking. In such cases this should be clearly highlighted by the evaluator, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgements about project performance.

2.3. Project Evaluation Parameters

The success of project implementation will be rated on a scale from ‘highly unsatisfactory’ to ‘highly satisfactory’. In particular the evaluation shall assess and rate the project with respect to the eleven categories defined below.³

A. Attainment of objectives and planned results:

1. *Effectiveness:* Evaluate how, and to what extent, the stated project objectives have been met (by activities), taking into account the “achievement indicators” in the project logframe/project document. The analysis of outcomes achieved should include, *inter alia*, an assessment of the extent to which the project has directly or indirectly assisted policy- and decision-makers to apply information supplied by this project:
 - Evaluate the immediate impact of the project on national management capacity necessary to reduce their greenhouse gas emissions. As far as possible, assess how the project has built the capacity of local stakeholders to support profitable EE projects through their critical financing phase. As well as the extent of the ability of the project to help domestic financial institutions better understand and ultimately finance EE projects; and how successful as the project been in allowing UN agencies to develop and internalize a new methodology for promoting private sector driven EE project.
 - As far as possible, also assess the potential longer-term impacts considering that the evaluation is taking place upon completion of the project and that longer term impact is expected to be seen in a few years time. Frame recommendations to enhance future project impact in this context. Which will be the major ‘channels’ for longer term impact from this project at the national and international scales?
2. *Relevance:* In retrospect, were the project's outcomes consistent with the focal areas/operational program strategies and country priorities? Ascertain the nature and significance of the contribution of the project outcomes to the Energy and Ozone Action Sub-programme and the wider portfolio of the DTIE.

³ However, the views and comments expressed by the evaluator need not be restricted to these items.

3. *Efficiency*: Was the project cost effective? Was the project the least cost option? Was the project implementation delayed and if it was, then did that affect cost-effectiveness? Assess the contribution of cash and in-kind co-financing to project implementation and to what extent the project leveraged additional resources. Did the project build on earlier initiatives? Did it make effective use of available scientific and / or technical information? Wherever possible, the evaluator should also compare the cost-time vs. outcomes relationship of the project with that of other similar projects.

B. Assessment of Sustainability of project outcomes:

Sustainability is understood as the probability of continued long-term project-derived outcomes and impacts after the UNEP project funding ends. The evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits after the project ends. Some of these factors might be outcomes of the project, e.g. stronger institutional capacities or better informed decision-making. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes. The evaluation should ascertain to what extent follow-up work has been initiated and how project outcomes will be sustained and enhanced over time.

Four aspects of sustainability should be addressed: financial, socio-political, institutional frameworks and governance, and ecological (if applicable). The following questions provide guidance on the assessment of these aspects:

- *Financial resources*. To what extent are the outcomes of the project dependent on continued financial support? What is the likelihood that any required financial resources will be available to sustain the project outcomes/benefits once the UNEP assistance ends (resources can be from multiple sources, such as the public and private sectors, income generating activities, and market trends that support the project's objectives)? Was the project successful in identifying and leveraging co-financing?
- *Socio-political*: To what extent are the outcomes of the project dependent on socio-political factors? What is the likelihood that the level of stakeholder ownership will allow for the project outcomes/benefits to be sustained? Is there sufficient public / stakeholder awareness in support of the long term objectives of the project?
- *Institutional framework and governance*. To what extent are the outcomes of the project dependent on issues relating to institutional frameworks and governance? What is the likelihood that institutional and technical achievements, legal frameworks, policies and governance structures and processes will allow for, the project outcomes/benefits to be sustained? While responding to these questions consider if the required systems for accountability and transparency and the required technical know-how are in place.
- *Environmental*. The analysis of ecological sustainability may prove challenging. What is the likelihood that project achievements will lead to sustained ecological benefits? Are there any environmental risks that can undermine the future flow of the project environmental benefits? The Terminal Evaluation should assess whether certain activities in the project area will pose a threat to the sustainability of the project outcomes. For example: construction of a dam in a protected area could inundate a sizeable area and thereby neutralize the biodiversity –related gains made by the project.

C. Achievement of outputs and activities:

Assessment of the project's success in producing each of the programmed outputs, both in quantity and quality as well as usefulness and timeliness. In particular, as this project had World Bank and UCCEE working in parallel, assess the ability of the project to carry out all activities undertaken by this partnership.

D. Catalytic role:

The terminal evaluation will also describe any catalytic or replication effect of the project. What examples are there of replication and catalytic outcomes that suggest increased likelihood of sustainability? Replication approach, in the context of UNEP projects, is defined as lessons and experiences coming out of the project that are replicated or scaled up in the design and implementation of other projects. Replication can have two aspects, replication proper (lessons and experiences are replicated in different geographic area) or scaling up (lessons and experiences are replicated within the same geographic area but funded by other sources). Specifically:

- Do the recommendations for the development of financial intermediation mechanism for EE projects have the potential for application in other countries and locations, other than Brazil, China and India?

If no effects are identified, the evaluation will describe the catalytic or replication actions that the project carried out.

E. Assessment of Monitoring and Evaluation Systems:

The evaluation shall include an assessment of the quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The Terminal Evaluation will assess whether the project met the minimum requirements for 'project design of M&E' and 'the application of the Project M&E plan'. UNEP projects must budget adequately for execution of the M&E plan, and provide adequate resources during implementation of the M&E plan. Project managers are also expected to use the information generated by the M&E system during project implementation to adapt and improve the project.

- **M&E design.** Projects should have sound M&E plans to monitor results and track progress towards achieving project objectives. An M&E plan should include a baseline (including data, methodology, etc.), SMART indicators (see Annex 4) and data analysis systems, and evaluation studies at specific times to assess results. The time frame for various M&E activities and standards for outputs should have been specified
- **M&E plan implementation.** A Terminal Evaluation should verify that: an M&E system was in place and facilitated timely tracking of results and progress towards projects objectives throughout the project implementation period (perhaps through use of a logframe or similar); annual project reports were complete, accurate and with well justified ratings; that the information provided by the M&E system was used during the project to improve project performance and to adapt to changing needs; and that projects had an M&E system in place with proper training for parties responsible for M&E activities.
- **Budgeting and Funding for M&E activities.** The terminal evaluation should determine whether support for M&E was budgeted adequately and was funded in a timely fashion during implementation.
- **Long-term Monitoring.** Is long-term monitoring envisaged as an outcome of the project? If so, comment specifically on the relevance of such monitoring

systems to sustaining project outcomes and how the monitoring effort will be sustained.

F. Preparation and Readiness

Were the project's objectives and components clear, practicable and feasible within its timeframe? Were the capacities of executing institution and counterparts properly considered when the project was designed? Were lessons from other relevant projects properly incorporated in the project design? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project implementation? Were counterpart resources (funding, staff, and facilities), enabling legislation, and adequate project management arrangements in place?

G. Country ownership

This is the relevance of the project to national development and environmental agendas, recipient country commitment, and regional and international agreements. The evaluation will:

- Assess the level of country ownership. Specifically, the evaluator should assess whether the project was effective in catalyzing action taken by the authorities in the country that received assistance from the project.
- Assess the level of country commitment to achieving a substantial reduction of greenhouse gasses emissions

H. Stakeholder participation / public awareness

Stakeholders are the individuals, groups, institutions or other bodies that have an interest or stake in the outcome of the UNEP financed project. The term also applies to those potentially adversely affected by a project. The evaluator will specifically assess if the project involved the relevant stakeholders through information sharing, consultation and by seeking their participation in project's design, implementation, and monitoring and evaluation. For example, did the project implement appropriate outreach and public awareness campaigns? Did the project consult and make use of the skills, experience and knowledge of the appropriate government entities, NGOs, community groups, private sector, local governments and academic institutions in the design, implementation and evaluation of project activities? Were perspectives of those that would be affected by decisions, those that could affect the outcomes and those that could contribute information or other resources to the process taken into account while taking decisions? Were the relevant vulnerable groups and the powerful, the supporters and the opponents, of the processes properly involved? Specifically the evaluation will:

- Assess the mechanisms put in place by the project for identification and engagement of stakeholders in each participating country and establish, in consultation with the stakeholders, whether this mechanism was successful, and identify its strengths and weaknesses.
- Assess the degree and effectiveness of collaboration/interactions between the various project partners and institutions during the course of implementation of the project.
 - Assess the degree and effectiveness of any various public awareness activities that were undertaken during the course of implementation of the project.

I. Financial Planning

Evaluation of financial planning requires assessment of the quality and effectiveness of financial planning and control of financial resources throughout the project's lifetime. Evaluation includes actual project costs by activities compared to budget (variances),

financial management (including disbursement issues), and co- financing. The evaluation should:

- Assess the strength and utility of financial controls, including reporting, and planning to allow the project management to make informed decisions regarding the budget and allow for a proper and timely flow of funds for the payment of satisfactory project deliverables.
- Present the major findings from the financial audit if one has been conducted.
- Identify and verify the sources of co- financing as well as leveraged and associated financing
- Assess whether the project has applied appropriate standards of due diligence in the management of funds and financial audits.
- The evaluation should also include a breakdown of final actual costs and co-financing for the project prepared in consultation with the relevant UNEP Fund Management Officer of the project

J. Implementation approach

This includes an analysis of the project's management framework, adaptation to changing conditions (adaptive management), partnerships in implementation arrangements, changes in project design, and overall project management. The evaluation will:

- Ascertain to what extent the project implementation mechanisms outlined in the project document have been closely followed. In particular, assess the role of the various committees established and whether the project document was clear and realistic to enable effective and efficient implementation, whether the project was executed according to the plan and how well the management was able to adapt to changes during the life of the project to enable the implementation of the project.
- Evaluate the effectiveness and efficiency and adaptability of project management and the supervision of project activities / project execution arrangements at all levels (1) policy decisions: Steering Group; (2) day to day project management in each of the country executing agencies and UNEP

K. UNEP Supervision and Backstopping

- Assess the effectiveness of supervision and administrative and financial support provided by UNEP/DTIE
- Identify administrative, operational and/or technical problems and constraints that influenced the effective implementation of the project.

The *ratings will be presented in the form of a table*. Each of the eleven categories should be rated separately with **brief justifications** based on the findings of the main analysis. An overall rating for the project should also be given. The following rating system is to be applied:

HS	= Highly Satisfactory
S	= Satisfactory
MS	= Moderately Satisfactory
MU	= Moderately Unsatisfactory
U	= Unsatisfactory
HU	= Highly Unsatisfactory

2.4. Evaluation report format and review procedures

The report should be brief, to the point and easy to understand. It must explain; the purpose of the evaluation, exactly what was evaluated and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

The evaluation will rate the overall implementation success of the project and provide individual ratings of the eleven implementation aspects as described in section 3 of this TOR. ***The ratings will be presented in the format of a table*** with brief justifications based on the findings of the main analysis.

Evidence, findings, conclusions and recommendations should be presented in a complete and balanced manner. The evaluation report shall be written in English, be of no more than 50 pages (excluding annexes), use numbered paragraphs and include:

- i) An **executive summary** (no more than 3 pages) providing a brief overview of the main conclusions and recommendations of the evaluation;
- ii) **Introduction and background** giving a brief overview of the evaluated project, for example, the objective and status of activities;
- iii) **Scope, objective and methods** presenting the evaluation's purpose, the evaluation criteria used and questions to be addressed;
- iv) **Project Performance and Impact** providing factual evidence relevant to the questions asked by the evaluator and interpretations of such evidence. This is the main substantive section of the report and should provide a commentary on all evaluation aspects (A – F above).
- v) **Conclusions and rating** of project implementation success giving the evaluator's concluding assessments and ratings of the project against given evaluation criteria and standards of performance. The conclusions should provide answers to questions about whether the project is considered good or bad, and whether the results are considered positive or negative;
- vi) **Lessons learned** presenting general conclusions, based on established good practices that have the potential for wider application and use. Lessons may also be derived from problems and mistakes. The context in which lessons may be applied should be clearly specified, and lessons should always state or imply some prescriptive action. A lesson should be written such that experiences derived from the project could be applied in other projects or at portfolio level;
- vii) **Recommendations** suggesting *actionable* proposals for improvement of the current project. In general, Terminal Evaluations are likely to have very few (perhaps two or three) actionable recommendations.

Prior to each recommendation, the issue(s) or problem(s) to be addressed by the recommendation should be clearly stated.

A high quality recommendation is an actionable proposal that is:

1. Feasible to implement within the timeframe and resources available

2. Commensurate with the available capacities of project team and partners
 3. Specific in terms of who would do what and when
 4. Contains results-based language (i.e. a measurable performance target)
 5. Includes a trade-off analysis, when its implementation may require utilizing significant resources that would otherwise be used for other project purposes.
- viii) **Annexes** include Terms of Reference, list of interviewees, documents reviewed, brief summary of the expertise of the evaluator/evaluation team, a summary of co-finance information etc. Dissident views or management responses to the evaluation findings may later be appended in an annex.

Examples of UNEP Terminal Evaluation Reports are available at www.unep.org/eou

Review of the Draft Evaluation Report

Draft reports submitted to UNEP EOU are shared with the corresponding Programme or Project Officer and his or her supervisor for initial review and consultation. The DGEF staff and senior Executing Agency staff are allowed to comment on the draft evaluation report. They may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. The consultation also seeks agreement on the findings and recommendations. UNEP EOU collates and review comments and provides them to the evaluators for their consideration in preparing the final version of the report.

2.5. Submission of Final Terminal Evaluation Reports.

The final report shall be submitted in electronic form in MS Word format and should be sent to the following persons:

Segbedzi Norgbey, Chief, Evaluation and Oversight Unit

UNEP, P.O. Box 30552-00100

Nairobi, Kenya

Tel.: (254-20) 7623387

Fax: (254-20) 7623158

Email: segbedzi.norgbey@unep.org

With a copy to:

Eric Usher, Head Renewable Energy and Finance Unit

DTIE, Energy Branch

Paris

Tel: +46733121528 or +33144371429

Fax: +33144371474

Email: eric.usher@unep.fr

Mark Radka, Head of Energy Branch

DTIE

Paris

Tel: 33 1 44 37 14 27

Fax: 33 1 44 37 14 74

Email: mark.radka@unep.fr

Mr. John Christensen Head of Centre

UNEP Collaborating Centre on Energy and Environment (UCCEE)

Denmark

Tel: + 45 46 77 51 30

Fax: + 45 46 32 19 99

Email: john.christensen@risoe.dk

The final evaluation report will be printed in hard copy and published on the Evaluation and Oversight Unit's web-site www.unep.org/eou. Subsequently, the report will be sent to DTIE for review. In addition the final evaluation report will disseminated to: The relevant DTIE Focal points, Relevant Government representatives, UNEP DTIE Professional Staff, The project's Executing Agency and Technical Staff.

2.6. Resources and schedule of the evaluation

This terminal evaluation will be undertaken by an international evaluator contracted by the Evaluation and Oversight Unit, UNEP. The contract for the evaluator will begin on 26th of March 2008 and end on 26th June 2008 (1 month spread over 3 months). After an initial telephone briefing with EOU and UNEP/DTIE, the evaluator will travel to China and Brazil (12 days of travel and 18 days desk study). The evaluator will submit a draft report no later than 28th of April to UNEP/EOU. Any comments or responses to the draft report will be sent to UNEP/EOU for collation and the consultant will be advised of any necessary revisions. Comments to the final draft report will be sent to the consultant by 19th of June after which, the consultant will submit the final report no later than 24th of June.

The evaluator should not have been associated with the design and implementation of the project. The evaluator will work under the overall supervision of the Chief, Evaluation and Oversight Unit, UNEP. The evaluator should be an international expert in environmental economics. The consultant should have the following minimum qualifications: (i) experience in the renewable and energy efficiency sector and with financing of EE technologies; (ii) experience with management and implementation of development projects in developing countries; (iii) experience with project evaluation. Knowledge of UNEP programmes is desirable. Fluency in oral and written English is a must.

2.7. Schedule Of Payment

The consultant shall select one of the following two contract options:

Lump-Sum Option

The evaluator will receive an initial payment of 30% of the total amount due upon signature of the contract. A further 30% will be paid upon submission of the draft report. A final payment of 40% will be made upon satisfactory completion of work. The fee is payable under the individual Special Service Agreement (SSA) of the evaluator and is **inclusive** of all expenses such as travel, accommodation and incidental expenses.

Fee-only Option

The evaluator will receive a payment of 40% upon submission of 1st draft report. Final payment of 60% will be made upon satisfactory completion of work. The fee is payable under the individual SSAs of the evaluator and is **NOT** inclusive of all expenses such as travel, accommodation and incidental expenses. Ticket and DSA will be paid separately.

In case, the evaluator cannot provide the products in accordance with the TORs, the timeframe agreed, or his products are substandard, the payment to the evaluator could be withheld, until such a time the products are modified to meet UNEP's standard. In case the evaluator fails to submit a satisfactory final product to UNEP, the product prepared by the evaluator may not constitute the evaluation report.

Annex 5 Brief summary of the evaluator's expertise

Ms. Morel has over twenty years of experience at the international level in the field of energy, environment and socio-economic issues. Her key qualifications are:

- Projects and programmes identification, monitoring and evaluation
- Energy efficiency and Renewable energy policy and strategy expert
- Development of action plans for renewable energy sources and energy efficiency
- Communication expert
- Energy economist
- Expertise in project financing, energy contracting
- Elaboration of strategies for the development and implementation of energy technologies
- Participation in various evaluation committees, such as for PHARE, 5th Framework Programme, SAVE, ALTENER, Intelligent Energy-Europe
- Capacity building, training
- Project management; management of a framework contract in the energy sector
- Experience in working with international institutions (GEF, UNDP, World Bank, EBRD, EC)