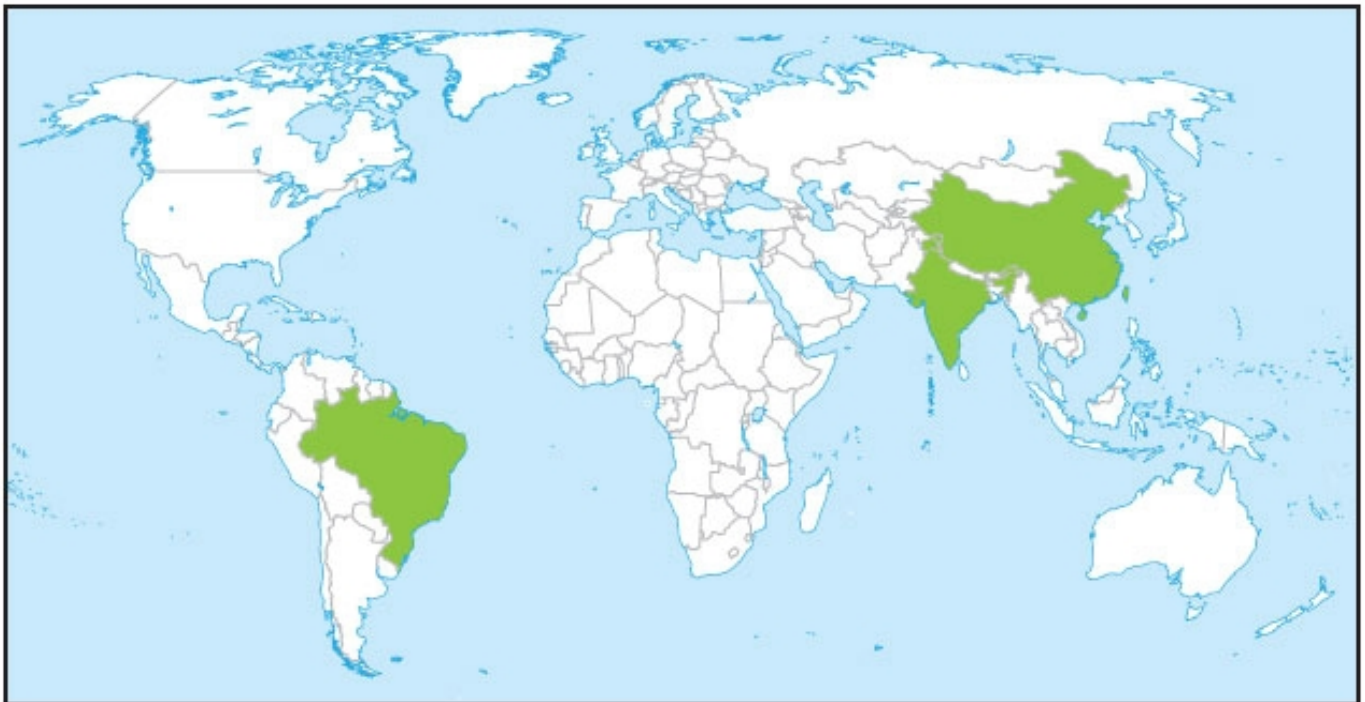


Financing Energy Efficiency

Lessons from Recent Experience with a Focus on Brazil, China and India



May 16, 2006



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EXECUTIVE SUMMARY

Energy Efficiency Financing and the Three Country Energy Efficiency Project

New or improved programs to better capture the enormous potential for energy savings in existing industries and buildings in the developing world have an important role to play for the environment and for local economic development, especially over the next decade.

Currently many thousands of energy efficiency projects with strong financial rates of return remain unimplemented in the world at large, but especially in developing countries. The essential issue blocking development of the potential energy savings is the under-developed state of project delivery mechanisms. Traditional investment delivery mechanisms operated by local financial institutions have often played useful roles in the energy efficiency business, but still only a fraction of the potential has been tapped. Renewed and strong efforts are required to develop investment mechanisms to operate in the market which can combine effective technical project development with financial products appropriate for dispersed investments with benefits concentrated in operating cost savings. There have been many programs in recent years which aim to develop such mechanisms. Some have succeeded and some have failed. Given the urgent need to ramp up energy efficiency investments in the future, this report evaluates the experience of past efforts, attempts to summarize lessons learned, and provides suggestions on how these lessons learned may be applied in the future. The report concentrates on Brazil, China and India, but also includes review of experiences in other developing countries.

This report was prepared through the UNEP-World Bank multi-year technical assistance effort, “Developing Financial Intermediation Mechanisms for Energy Efficiency Projects in Brazil, China and India” (the Three Country EE Project), with financial support from the United Nations Foundation and ESMAP. The purpose of this project was to generate new ideas and approaches for developing energy efficiency financing schemes, which then could be tried out by local institutions, with support from the World Bank and other international agencies and donors where necessary. Core Groups of representatives of both the financing and energy efficiency development communities in each of the three countries implemented project activities. Energy efficiency and banking industry practitioners from each country also met in four formal cross-exchange workshops, and various informal meetings, to exchange lessons learned and ideas. This report attempts to synthesize the considerable practical knowledge generated which is applicable across countries, together with some additional knowledge from other World Bank Group and donor efforts in other countries. Separate detailed reports are also available concerning analysis undertaken and conclusions in each country.

Following an introduction in Chapter 1, the report summarizes the overall energy efficiency agenda and different tools to promote that agenda, and then focuses on needs to develop financing mechanisms for energy efficiency investments in existing enterprises and facilities in Chapters 2 and 3. Chapter 4 provides a framework for thinking about the basic institutional challenges and the basic types of energy efficiency investment mechanisms. Chapter 5 deals with the needs that all such mechanisms have for marketing, project development and technical assessment of energy efficiency projects, needs for local capacities in these areas, and the options for developing and incorporating such capacities within investment delivery mechanisms. Chapter 6 deals with the needs for arranging financing flows which all investment mechanisms require, the issues involved, and the options available for meeting these needs. Chapter 7 summarizes experience with the development and operation of a range of energy efficiency investment mechanisms, and lessons learned. Chapter 8 provides some basic conclusions, including summary advice from the study team concerning each country, perceptions as to the roles of international financial institutions, and some operational suggestions for those considering new energy efficiency financing programs.

Annex 1 to the report provides 15 case studies of different types of energy efficiency financing mechanisms which have been implemented in Brazil, China, India, Hungary, Romania, Lithuania, Sri Lanka and North America. The case studies describe advantages and disadvantages of the different approaches adopted, and specific lessons learned. They provide a platform for the presentation of the synthesized conclusions in the main report.

The Need for Energy Efficiency Investment Financing Interventions

The critical importance of improving energy efficiency globally, but especially in rapidly growing developing countries such as China, India and Brazil, is well documented in other analyses. IEA's World Energy Outlook 2004 projects in its reference scenario a 60 percent increase in global energy demand with a matching increase in carbon dioxide emissions over the next 25 years. China, India, and Brazil represent three of the top ten energy consuming nations in the world now, and their share in total consumption will certainly increase. In the world as a whole, but especially in these rapidly growing developing countries, efficiency improvements to generate more economic output with less energy input is essential for reasons of energy supply security, economic competitiveness, improvement in livelihoods and environmental sustainability. In an Alternative Policy Scenario, developed to investigate how a more sustainable global energy supply and use economy might be developed by 2030, the IEA estimates that two-thirds of the hoped for carbon dioxide reduction emissions in developing countries must come from improved energy efficiency, and the balance from improvements in the mix of energy supply technologies.

To consider, specifically, how to achieve energy efficiency gains, the overall "energy efficiency terrain" must be dissected, as different aspects of the problem must be addressed in very different ways. At a first level, reduction in energy use per unit of

economic output can be achieved in two ways—through energy savings stemming from changes in economic structure, or through energy savings stemming from technical efficiency gains. Structural energy savings are the result of broad trends in economic development (for example, changes in sources of industrial value added), and are not very amenable to direct policy influence. Specific energy efficiency policies and programs, therefore, focus on achievement of technical savings—reducing energy use per unit of physical output, not output value.

Looking at technical energy savings potential, then, it is useful to separately consider new facilities and existing facilities. Improving technical energy efficiency in new facilities is especially important over the longer term, and particularly in fast-growing economies. However, the individual investors who build new power plants, transport systems, industrial capacity or buildings must weigh many factors in deciding on technology and designs, and energy efficiency is only one factor—and often a minor one to them. The challenge for governments in this case is to influence the broad technology choice decisions of investors, to encourage them to adopt energy efficiency solutions. The main tools which governments can use to intervene here are policy and regulatory tools.

Reviewing how to improve energy efficiency in existing facilities, it is important to further distinguish among different markets and types of projects to decide the most appropriate ways to intervene. Often, major energy efficiency gains can be achieved through investment in broad restructuring projects—to revamp entire production processes in industrial enterprises, or overhaul urban transportation systems, for example. In these cases, too, energy efficiency is only one of many factors involved in the selection of technologies by investors, and the tools available to promote energy efficiency are again primarily policy and regulatory tools aimed at influencing those choices. In other cases, however, there are specific projects aimed at just improving energy efficiency—by replacing outdated boilers, utilizing wasted heat or industrial gases, or installing more efficient electrical equipment, for example. Here, development and financing of specific energy efficiency investment projects is required.

This report considers solutions for expanding investment in those specific investment projects where the primary objective is improvement in energy efficiency. These investments represent only a piece of overall effort to improve energy efficiency, but the piece most amenable to specific energy efficiency investment interventions, as opposed to policy and regulatory interventions. Furthermore, focus is placed on how to expand investment in energy efficiency projects dispersed through economies, rather than those concentrated in a few very large companies, such as energy supply utilities. Energy saving opportunities can be found in existing industries and buildings of all types, in projects which typically range from \$50,000 to \$ 5 million in size. As documented in many other studies, a wealth of such “standard” energy efficiency investment projects remain unimplemented, especially in Brazil, China and India, despite high financial rates of return, and payback periods which are 1-5 years (with many in the 1-2 year range). Capturing these project opportunities, which are often winners from perspective of both

society at large and investors, has long been an attractive target, but success has been elusive. Some of the reasons include:

- Missing or incomplete markets, in particular markets for risk or for ‘contingent claims’;
- Weak contracting institutions (legal systems) that result in insecure contracts with low certainty of equitable enforcement;
- Political and economic uncertainty;
- Policy distortions and/or changes in relative prices for energy and other resources since the original investments were made;
- Difficulty in addressing small or not easily replicable projects on a large scale; and
- The fact that growth or capturing new market share trumps productive efficiency in investment decisions in rapidly growing economies.

The challenge is to develop means to design, package and finance energy efficiency investment projects efficiently, based to the maximum extent possible on available in-country systems. Experience shows that this does not happen naturally at levels corresponding to more than a small fraction of the potential. Specific, customized efforts are required to develop project investment delivery mechanisms which can sustainably operate in local markets. This, then, is the primary focus of the agenda to expand uptake of financially viable energy efficiency investment projects.

Delivery of Energy Efficiency Financing is an Institutional Development Issue

Development and operation of energy efficiency investment delivery mechanisms is an institutional development issue, and energy efficiency financing programs and projects must recognize this clearly. Lack of domestic sources of capital is rarely the true problem. Instead inadequate systems for accessing funds is usually the main problem. Institutional mechanisms to capture the opportunities for energy efficiency investment need to be created or strengthened. This entails sustained efforts—new institutional constructs cannot be expected to develop and grow overnight.

Clearly the development of institutional solutions in the form of investment delivery systems must fit local institutional environments in order to be effective. Solutions developed in one institutional environment in one country often will not work effectively in a different institutional environment. While this may seem to be common sense, a leading source of project failure in energy efficiency financing projects comes from attempts to translate solutions developed elsewhere into an environment where they do not fit. For success, local institutional environments must be well understood, and solutions usually need to be customized for those environments.

Further, all energy efficiency financing mechanisms must successfully meet two functions: a marketing, project development and technical function to efficiently package good projects, and a financing function to provide financing for them. Another common

source of program failure is inadequate balance between these two functions. This leads to insufficient project pipeline development to meet the needs of financiers, or inability to arrange financing for a series of well developed projects. Each of these functions is discussed separately below, and in separate chapters of the main report.

Finally, there must be sufficient incentives for the various players in a given institutional mechanism to undertake the functions expected. Again, while this may be common sense, it is at times difficult to achieve, given the variety of contractual arrangements required within local institutional frameworks which vary substantially between countries.

Generally speaking, there are three basic types of institutional delivery mechanisms for energy efficiency investment projects which have been popular in recent years:

- Loan financing schemes and partial loan guarantee schemes, operating either within the commercial banking system or as specialized development institutions or revolving funds;
- Use of energy service companies (ESCOs). In this report, ESCOs are defined to include any company using energy performance contracting as part of energy efficiency investment transactions. An energy performance contract (EPC) in the ESCO business may be broadly defined as a contract between the ESCO and its client, involving an energy efficiency investment in the client's facilities, the performance of which is somehow guaranteed by the ESCO, with financial consequences for the ESCO; and
- Utility demand-side management (DSM) programs, where energy distribution utilities organize all aspects of delivery, including financing, technical development, and interface with users.

It is common, also, to mix more than one of these in development of specific investment delivery programs.

Delivering Investment Project Designs and Technical Appraisals

For energy efficiency investments to be made, energy efficiency concepts must be marketed, and projects must be identified, designed, and appraised. This requires marketing, project development and technical assessment capacity, typically provided by local energy efficiency practitioners. Human and organizational capacity is needed to define market penetration strategies, identify project opportunities, design appropriate project packages at end-user facilities, and to assess financial returns and the risks influencing delivery of the project cost-savings cash flow.

Early assessment of potential markets is important when developing energy efficiency delivery programs as different markets require different approaches. Selection of market segments for concentration will define organizational arrangements for

technical work, and the types of financial products developed. In addition, different stakeholders may have very different interests in market development strategies—one bank may be interested primarily in developing new small and medium-sized enterprise clients, while another may be primarily interested in providing new services to existing large commercial customers.

Once markets are defined, marketing needs to be conducted, followed by project development. Project development includes a series of key tasks, involving not only technical assessments. Included are initial project identification, customer enlistment/acceptance of project concepts, detailed design of project components, calculation of project economics, and identification and allocation of project risks.

Capacity to undertake project development work typically is found among project appraisal companies, energy survey and auditing firms, university or research institute departments, industry associations, equipment vendors, or energy service companies (ESCOs). In Brazil, China and India, existing local capacity in the energy efficiency industry is strong. In countries where local capacity is weak, development of this capacity then becomes a top priority—even a prerequisite—for energy efficiency project development. At times, capacity might be borrowed from neighboring countries, but excessive reliance on international consultants is generally unsustainable.

For countries such as Brazil, China and India, the issue is how to most efficiently access project development capacity. Almost always, both financiers and end-users require some degree of independent assessment—where a trusted ESCO might be able to fully meet the needs of both, usually the financier or the end-user still wish to have some level of independent technical assessment. The issue then becomes the degree of outsourcing. Among end-users, major industrial enterprises often may conduct technical assessments largely in-house, with perhaps only some very specialized outsourced expertise. Building owners, on the other hand, usually outsource virtually all of the project development and assessment effort. The situation among financiers also varies—some development finance institutions (DFIs) may have quite sophisticated in-house technical assessment capacity, whereas some commercial banks may largely farm out such work to trusted partners.

To operate properly, energy efficiency investment financing mechanisms must include efficient and cost-effective institutional arrangements for delivering the technical assessment requirements, through a combination of in-house and outsourced arrangements. Two points may be worth special attention:

- The path dependence of different available project development groups is often a critical factor determining their effectiveness in a given energy efficiency financing scheme. Such groups typically have complex historical and staffing relationships which heavily impact their effectiveness as contractors for financiers or end-users, especially in developing countries. Lack of attention to this has resulted in the failure of some projects developed by international institutions; and

- Keeping transaction costs reasonable is often a major challenge. Design may require innovation. For example, for their general and energy efficiency lending to small and medium-size enterprises, Indian banks have relied on a geographical and industry-specific clustering approach.

Delivering Financing

The main in-country options for financing of energy efficiency investment projects include financing from the own resources of end-users, local banks (including local branches of international banks), leasing companies, and other non-bank financial institutions (NBFIs), such as IREDA in India. ESCOs may provide financing to end-users, but then also require financing from others. Other, occasional sources include export credits, equity capital financing through special purpose companies, financing from utilities repaid through energy bills, or informal sources. Multilateral development banks may provide direct financing to especially large end-users such as utilities, but otherwise financing from these banks usually needs to be channeled through local intermediaries.

Despite the variety of sources in principle, it is clear that ultimately the key source of sustainable and sizeable flows of finance in most countries is the local banking sector. Although circumstances do vary considerably, the following observations hold true in many cases and are important in how banks tend to view energy efficiency investment projects:

- Energy efficiency projects often represent a relatively small niche business for major banks;
- Project finance for cost-savings projects is non-conventional. Most lending in Brazil, India and China is for working capital, and if project finance is available, it is usually for large projects. Term lending for projects to improve business efficiency and increase productivity is uncommon;
- Banks lack knowledge of energy efficiency technology, and (reasonably) consider such specialized knowledge outside of the scope of their operational interest;
- Existing procedural frameworks within banks vary and are important. To be operationalized effectively, new lines of business must be fit into existing systems;
- Customer relations are important, and the strategies of banks to attract and retain customers often dictate areas of interest in new business lines; and
- Transaction costs for small projects are often a key issue.

In some countries, the local banking sector may be close to dysfunctional, the policy environment may be distorted, or the sector is in the midst of uncertain major transitory reforms, making it difficult to use local banks for financial intermediation. To develop energy efficiency financing efforts may then involve difficult choices between incurring high risks of working in an immature banking sector, developing independent solutions, or foregoing the effort. If the decision is to proceed, especially with an

independent approach, the high risks and needs for intensive efforts during implementation, including flexibility to adopt major mid-course corrections, should be recognized upfront.

In many cases, energy efficiency projects can be attractively financed using existing bank loan products, without special adjustments or development of new financial products. However, modifications of financial products to match the characteristics of energy efficiency projects can help expand the market for such loans and increase uptake of financially viable, yet unimplemented projects. The main direction for developing more customized financial products is to develop mechanisms which recognize and define the cost-reduction cash flow benefits of the projects, and use this flow of funds as a source of loan repayment and security. The key is for financiers to increasingly recognize the characteristics of the cash stream generated by the projects financed, and to structure loans and repayment assurances to best take advantage of that. There is an art in developing enhancements and modifications, grafted onto existing primary loan products.

Some of the special tools used by financiers as mechanisms to partially mitigate repayment risks from borrowers for energy efficiency projects, using the generated project cash flows, include:

- Matching loan repayment schedules to project cash flow;
- Use of escrow accounts for loan repayment, into which borrowers deposit cash from energy cost savings;
- Use of energy efficiency performance guarantees provided by third parties such as ESCOs;
- Use of ESCOs as project aggregators;
- Arranging for loan repayments to be made through utility bills; and
- Development of build-operate-own or build-operate-transfer cogeneration projects under *chauffage* contracts.

Making Integrated Mechanisms Work

For institutional delivery mechanisms integrating project development and financing to be successful in increasing energy efficiency project investment, they should be built upon the following principles:

- Institutional approaches need to be customized, based on a careful diagnostic review of the local institutional environment, including financial sector, local capacities for technical assessment, energy efficiency market, and government role, and carried out with local expertise;
- End-users should face commercial terms for the financing and technical services being provided, since this is the only foundation for the creation of a sustainable energy efficiency market. Subsidies tend to ultimately undermine this objective since they are usually short-lived. However, many successful mechanisms have

- been introduced with concessional financing to buy down the high costs and risks of starting up, build capacity, try new approaches, etc.; and
- Appropriate incentives must be included for the various actors in each mechanism to participate. Particularly important are incentives to generate deal flow.

Suggestions resulting from operational experience with the main types of energy efficiency investment delivery mechanisms are summarized below.

Energy Efficiency lending through local commercial banks offers the highest prospect of program sustainability and large-scale impact. Experience suggests:

- (a) Design of major operations might best begin with partnerships with the financial intermediaries, and cater to their business approach and market development strategies. The financial intermediaries should select the institutional arrangements for project development and technical assessment that best meet their needs and match their business preferences;
- (b) Not all banks are likely to be interested in promoting energy efficiency projects as a specific line of business. However, an energy efficiency lending business may be useful for some as a means to achieve broader strategic goals. Some banks may be interested in developing such products geared to enhancing productivity as an extra service for existing good customers. Others may use energy efficiency loan products as a tool for entering or strengthening the bank's position in specific markets or business lines, such as the small and medium-sized enterprise market or medium-term maturity loans to large industries; and
- (c) Integration of institutional arrangements for technical assessment work with the financial intermediation of the banks is essential. Development and control of the arrangements would preferably be led by the banks.

Partial-risk loan guarantee programs supported by international financial institutions have shown some success in recent years in jump-starting energy efficiency financing programs through local financial institutions. This instrument is designed to defray part of the risks of loan repayment for energy efficiency loans, often perceived by local banks unfamiliar with energy efficiency business concepts or specialized means to mitigate those risks. The instrument also may provide a useful platform for delivery of a broad package of assistance to financial intermediaries. However, loan guarantee programs are not a broad panacea which can solve the difficulties often faced in efforts to expand energy efficiency investment. They are useful where the banking system functions fairly well, and the fundamental conditions which would allow energy efficiency lending to prosper are already in place.

Recent energy efficiency investment loan guarantee programs developed in Hungary and China show quite different approaches, although both have met with success so far.

The use of **Development Finance Institutions (DFIs) and Special Revolving Funds** is another common approach. An advantage is that DFIs and special loan funds can be designed as “one-stop shops,” combining financial intermediation with strong project development functions, as the institutions have a dedicated, specialized purpose. In some cases where the local financial sector is under stress or in the midst of transitional reforms and restructuring, setting up special entities dedicated to energy efficiency lending may be the only way to establish funding channels. Separation from the banking sector, however, also carries major disadvantages and major risks. Where DFIs are established to act as catalyzing agents to pioneer the new business, and help develop take-up by commercial banks, the proposition provides additional, difficult operational challenges. In some cases, especially with special revolving funds which have been added as components to bigger projects, capacities to appropriately deal with the details of proper credit evaluation and loan processing are insufficient.

ESCOs can be an important market-based institutional mechanism involved in the delivery of energy efficiency investment. ESCOs which provide financing to clients may be viewed as a partial energy efficiency investment financing mechanism, operating at the retail level. These ESCOs serve as project aggregators, to which financial institutions may provide financing for a package of projects, and reduce their direct involvement with end-user clients. Experience with ESCOs in developing countries has been mixed. The study team summarizes the following lessons learned:

- The ESCO model is not a magic bullet to solve problems in delivering energy efficiency investment. The still short history of ESCOs in China shows that they can play an important role, if local institutional environments are suitable, but also that the industry start-up is very complex, requiring complex contractual arrangements, staff with technical and financial and business experience, access to funding, etc. The ESCO model does not solve basic problems of delivering energy efficiency project financing. Even when ESCOs provide financing to clients, the ability of the ESCOs themselves to obtain project finance is a central, difficult issue;
- Financing of ESCOs should be considered upfront in any serious effort to promote local ESCO businesses. Programs that provide only technical assistance to build ESCO capacity alone have not proven very helpful;
- Active government support for ESCO development is critical, especially in the early stages, as experience from both North America and China shows. Support may include direct strategic support or assistance through market creation; and
- The choice of ESCO business model should be determined by the local market, especially whether to use shared savings or guaranteed savings energy performance contracts. For some ESCO clients such as building or commercial facility owners with little knowledge of energy saving technologies and their operation, the guarantee of energy savings may be very important. Clients in industrial facilities, on the other hand, may be very knowledgeable about energy savings of different investments and instead be interested in off balance sheet financing through ESCOs.

Utility Demand-side Management (DSM) Programs. Although DSM programs were not one of the topics covered under the Three Country Energy Efficiency Project, these programs do represent another option for promoting energy efficiency investments, relying on the financial, organizational and technical strength of major utilities to deliver numerous small-scale energy efficiency investments, using their relationships with consumers. In principle, the combination of delivery of energy efficiency together with delivery of energy supply would result in providing energy services as efficiently as possible. However, energy efficiency, *per se*, runs counter to the general business interests of supply utilities—a kilowatt-hour saved is a loss of sale and sales revenue. Thus, Government or industry regulators must usually provide special incentives to utilities to pursue such programs when they cut revenues. Such regulation is difficult to undertake efficiently, especially in developing countries. Under these circumstances utility DSM programs may best be promoted only where: (i) the utility industry is relatively responsive to public sector mandates; (ii) energy efficiency efforts are combined with power factor correction or load management efforts that are in the interests of the utility; and/or (iii) certain cases where promotion of energy efficiency may provide major benefits to the utility such as expanding its customer base or reducing sales to customers whose tariff is lower than the cost of service.

Moving Ahead

One clear message from the experience of the Three Country Energy Efficiency Project is the importance of establishing and maintaining practical, operationally focused dialogue between the banking community and the energy efficiency promotion community. This dialogue helped generate new energy efficiency lending programs in a number of Indian banks, laid a platform for the proposed development of new energy efficiency financing initiative with major Chinese banks with World Bank support, and foster the development of a proposed new ESCO loan guarantee program in Brazil. Each country hopes to continue to build upon the platforms created.

Another clear conclusion is the central importance of strategic government support to more aggressively promote new energy efficiency financing mechanisms in each of these three countries. China's government has set an ambitious target to reduce energy use per unit of GDP by 20 percent during 2006-2010—and the challenge for the Government is to mobilize effective implementation measures across the energy efficiency terrain. In the cases of Brazil and India, the study team recommends consideration of new, strategic reviews at the national level to consider medium and long-term strategic priorities across the energy efficiency terrain. In the area of energy efficiency investment financing, a number of promising concepts have been developed, and it is important for the central Governments to use their convening power and certain strategically focused but sustained institutional development support interventions to enable new concepts to gain stronger operational footholds and scale up.

Well-targeted support from international financial institutions (IFIs) also can play an important role. The ability of IFIs to combine investment financing and technical

assessment support in multi-year packages is important in order to not just plan and train, but to actually implement promising new ideas. The IFIs also are able to maintain a sustained presence which is necessary to provide sustained support in seeing through new operational mechanisms from the design to development to start-up and finally operational roll-out. Because the problem to be solved is lack of adequate delivery systems for energy efficiency investment, and not lack of in-country capital, however, the success of IFIs should be measured in terms of energy efficiency results, where possible, and not volumes of lending, which is not directly relevant.

Project support of the Global Environment Facility (GEF) for commercially-based energy efficiency financing projects has been especially critical and beneficial over the last decade. When introducing and developing new mechanisms, GEF grant financing for technical assistance and for investment support has proven to be a critical tool—to try new pilot projects, to cover part of the initially high transaction costs of schemes, and especially to help cover initial risks. Continued strong support from the GEF can make a very big difference to the rate of success of developing countries in this area in the coming years.

The authors hope that the analytical framework provided in this report and details concerning project implementation experience will be a useful contribution to those considering development of specific new projects. Summarizing, the three biggest causes of operational failures in energy efficiency financing projects are: (i) mismatches between the solutions attempted and local institutional environments; (ii) lack of proper balance between and concentration upon combining financial intermediation functions and project development functions; and (iii) lack of sustained effort and follow through, especially for adjusting institutional mechanisms and approaches during implementation, in response to market changes or arising operational inefficiencies. To avoid these mistakes and direct concerted efforts to achieve the best results possible in the future, the study team has the following broad suggestions:

- Careful diagnostic work on existing in-country conditions should form the basis for project design and interventions that fit within the local institutional contexts;
- For projects involving financial intermediation, parallel attention to the details of developing capacities and mechanisms for financial intermediation aspects and for project pipeline development and technical appraisal is strongly recommended;
- It is important to incorporate periodic review and flexibility in design, so that programs can be adjusted during implementation; and
- All of the above result in exceptionally high labor intensity for program management, operation and technical support, not only during preparation but also during program implementation. High quality and concentrated time from program management and expert personnel is essential for new institutional mechanisms to be nurtured along to success.

Energy efficiency financing operations are relatively costly and time-consuming to develop and implement. Development of the associated new institutional mechanisms

requires intensive, multi-year efforts. If this is not possible to organize, it may be best to not attempt such ambitious programs. However, where possible, these programs can make a major, positive difference. With strong returns in terms of financial benefits to enterprises and energy consumers, and with very high potential returns per unit of public investment in environmental and energy security benefits to countries, further development of sustainable energy efficiency financing delivery mechanisms undoubtedly has a major role to play in meeting the energy development and climate change abatement challenges of the future.