World Bank GEF Energy Efficiency Portfolio Review and Practitioners' Handbook

Thematic Discussion Paper
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World Bank Environment Department
Climate Change Team

Abbreviations and Acronyms

AFR	Africa Region
ASTAE	Asia Alternative Energy Program
CEEF	IFC's Commercializing Energy Efficiency Finance Project
CEO	Chief executive officer
CFO	Chief financial officer
DSM	Demand-side management
EAP	East Asia & Pacific Region
ECA	Eastern Europe & Central Asia Region
EE	Energy efficiency
ELI	IFC's Efficient Lighting Initiative
ESCO	Energy service company
ESMAP	Energy Sector Management Assistance Program
FI	Financial institution
FSP	Full-sized project
FY	Fiscal year
GEF	Global Environment Facility
GFA	Guarantee framework agreement
HEECP	IFC's Hungary Energy Efficiency Co-financing Program
IA	Implementing agency
ICR	Implementation Completion Report
IFC	International Finance Corporation
LAC	Latin America & Caribbean Region
M&V	Monitoring & verification
MLF	Montreal Protocol Investment Fund
MNA	Middle East & North Africa Region
MOU	Memorandum of understanding
MSP	Medium-sized project
MTR	Mid-term review
NGO	Non-governmental organization
PAD	Project appraisal document
PIU	Project implementation unit
PSR	Project supervision report
REEF	IFC's Renewable Energy and Energy Efficiency Fund
SAR	South Asia Region
TA	Technical assistance
TT	Task team
TTL	Task team leader
UNDP	United Nations Development Program

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1. Introduction

In May 2003, the GEF Secretariat, in its bilateral meetings with the Bank, requested an overview of the Bank's future plans for energy efficiency (EE) over the medium-term (under GEF Operational Program No. 5 – Removal of Barriers to Energy Efficiency and Energy Conservation). This request was, in part, due to the growing pipeline of EE programs involving the financial sector and growing portfolio in the Eastern Europe and Central Asia Region. The Bank's Climate Change Team agreed to conduct a review of its EE portfolio to date and use this opportunity to identify useful case studies and good practices that could be made available to regional colleagues to support their EE operational work, particularly financing programs.

Methodology

In this regard, a review was undertaken of all EE GEF projects implemented by the Bank since the GEF's inception in 1991. As a first step, a database of GEF EE project portfolio database was developed (see Annex 1). This database was then analyzed to develop aggregate project data, analyze emerging trends, identify various portfolio characteristics and other parameters of interest. In terms of project activities, for the purposes of this review, the GEF portfolio was divided into three main periods: the first wave of projects (FY93-97) which can be considered the pilot period for GEF EE projects; a second wave of projects based on emerging experiences with the initial operations; and the third wave (FY03-06) which has begun to show a high concentration of EE financing components. In addition, a review of Staff Appraisal Reports, Project Appraisal Documents (PADs), Implementation Completion Reports (ICRs), Project Summary Reports (PSRs), Mid-Term Review Aide Memoires, GEF Project Briefs and GEF Concept Notes was completed. All current EE task team leaders (TTLs) were contacted and several interviewed to assess the portfolio, lessons learned and challenges for the future. Some relevant GEF thematic and key Bank EE reports were also reviewed.

Report Structure

This report summarizes the main findings of this review, assesses some trends in project designs and program models, highlights emerging lessons learned and attempts to offer some insights, suggestions and issues for continued discussion in the months and years ahead. The report is divided into five chapters: an introduction, summary of the project portfolio, discussion of program models and implementation experiences to date, EE financing programs and emerging good practices and conclusion. Given the high number of EE financing programs in the pipeline, the report places a particular emphasis on these types of operations. This report has been shared with colleagues from the Bank's climate change team, Bank and IFC operational colleagues and GEF Secretariat staff and their feedback was solicited.

II. The Project Portfolio

Since its creation in 1992, 42 EE projects have entered the GEF project pipeline, including 28 Bank full-sized projects (FSPs), 4 Bank medium-sized projects (MSPs) and 10 IFC investments (of which two are MSPs). (See Table 1 below.) Of these, nine have closed, 21 are under implementation and the remaining 12 are under preparation. These programs would lead to more than $3.3 billion in total investments in EE, with about 11% ($380 million) in approved GEF support. Most of the project co-financing is expected to be mobilized by the private sector and client counterpart funding (about $2.5 billion) with some support from Bank lending and IFC investments ($490 million).

Table 1. Summary of GEF EE Project Portfolio

	Number of Projects	Total Project Costs (USD million)	Total GEF Support (USD million)
Bank FSPs	28	$ 2,824	$ 305.6
Bank MSPs	4	$ 16	$ 3.0
IFC	10	$ 530	$ 73.7
TOTAL	42	$ 3,370	$ 382.2

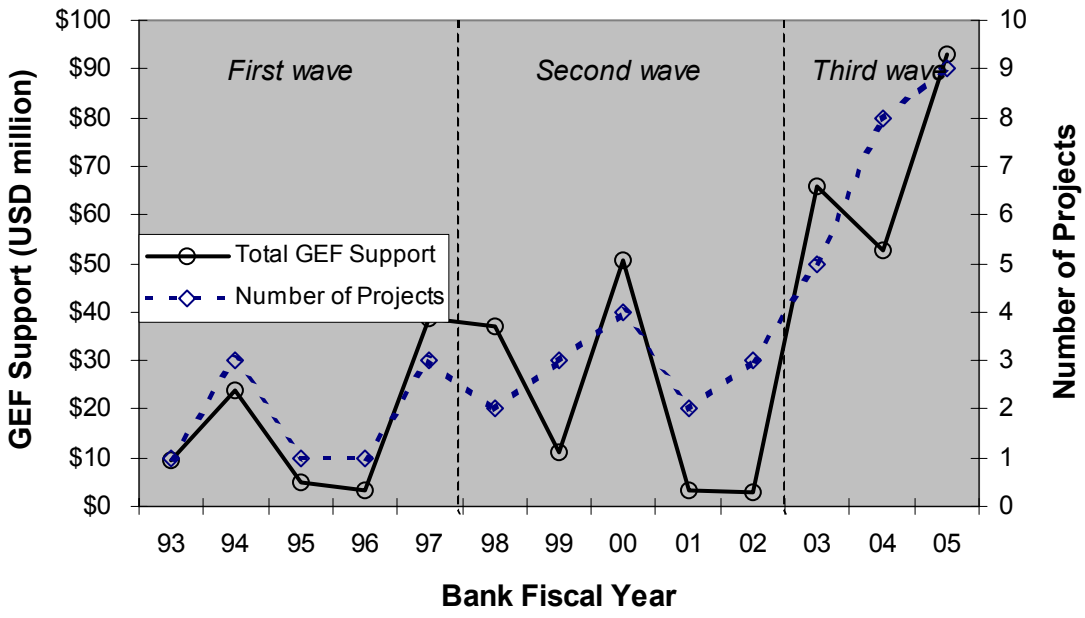
Notes: This includes all projects that have entered the GEF project pipeline since 1992. The totals represent the GEF approved amount and do not reflect any cancellations (which amount to $5.8 million). These figures include proposed projects and projects on hold, but do not include dropped projects or PDF B grants.

In terms of the evolution of the portfolio, project development has been rather sporadic (see Figure 1, next page), with 1-4 projects approved per year over the past 10 years (FY93-02) and a considerable jump in EE operations in the current period (FY03-06). Project sizes have ranged from $0.5-33.8 million (GEF EE components only) with an average size of $8.1 million. Despite common perception, the average size of the GEF EE projects has not decreased, although fewer include Bank co-financing than in the early years. (IFC co-financing opportunities for EE projects, though, are on the rise.) A number of other interesting findings from the Bank project data have emerged. However, it should be noted that since only about nine projects have closed to date, these data are merely indicative and will continually change as the portfolio ages and evolves. Project preparation times for Bank projects have ranged from 1.5-4.4 years, with an average of 2.6 years. Project implementation periods have increased, from 3-5 years in the first and second waves to 6-7 years for most projects now under preparation. All closed projects required on average a one year extension. This portfolio is expected to save over 475 million tons of CO_2 as a result of the GEF support, although actual savings are as yet unknown.

In terms of project designs, the first wave of projects (FY93-97) included 9 projects for $80 million in GEF support and supported several pilot and demonstration efforts to generate some basic implementation experiences and test various program models. As a result, these operations were somewhat varied in their approaches, dealing with selected EE products and market transformation efforts [China, Mexico, Thailand and Poland (IFC)], standards and codes [Sri Lanka, Thailand], utility demand-side management (DSM) [Jamaica, Mexico, Sri Lanka, Thailand], gas distribution loss reduction [China, Russia] and one financing program [Hungary (IFC)]. As initial experiences were obtained, the second wave of projects were designed (FY98-02) which included 14 projects for $105 million. These included some similar program types, such as EE products and market transformation [China, Mongolia, Thailand, Argentina (IFC) and ELI (IFC)], utility DSM [Brazil, Ecuador], as well as more market-oriented models such as energy service company (ESCO) development projects [Brazil, China, Cote d' Ivoire] and several more financing programs [India, Thailand, REEF and HEECP 2 (IFC)]. The third wave (FY03-06) includes some 25 projects for an estimated $212 million and almost every GEF EE project

now includes a major financing component, with many considering some type of partial loan guarantee facility.

Figure 1. History of GEF EE Projects



Regional Activities

In terms of regional distribution, East Asia & Pacific (EAP) has received by far the most GEF support for its EE activities, with 13 projects totaling about $177 million, or 57 percent of the total GEF EE commitments (excluding IFC investments). (See Table 2, next page.) Of EAP's share, China has received about 75 percent ($131 million). Eastern Europe & Central Asia (ECA) is the second largest beneficiary, receiving about half as much as EAP, or $88 million, of which IFC's program accounts for 40 percent. Latin America & the Caribbean (LAC), South Asia (SAR) and IFC's global initiatives are each under 10 percent of the total portfolio and commitments to Middle East & North Africa (MNA) and Africa (AFR) have been minimal. This suggests that, while the GEF have supported some $380 million in EE initiatives worldwide, some regions and many countries still have enormous potential for tapping GEF resources.

EAP. As noted above, the East Asia Region has been most consistently active in the Bank's GEF EE program. During this period, EAP's EE projects have largely dealt with a major climate change program in China (dealing with gas distribution, ESCO development and financing, boilers and buildings); utility DSM programs (Thailand, Vietnam), ESCO development (Thailand, Vietnam), EE products (Thailand, Mongolia) and a distribution loss reduction program (Philippines). In recent years, the China program has seen a sharp decline in new commitments while new initiatives are being considered in other countries (DSM activities in Laos, distribution loss reduction in Vietnam). However, given the still rising demand for energy in many of these countries, considerable more work can be done, such as ESCO development and financing in the Philippines, initiation of some basic EE/DSM work in Indonesia, work on power sector

regulations in China and Thailand, etc. IFC's only involvement in EAP to date has been the ELI program in the Philippines.

Table 2. GEF EE Projects By Region

	Number of Projects	Total Project Costs (USD million)	Total GEF Support (USD million)
AFR	2	$ 6	$ 1.2
EAP	13	$ 2,184	$ 176.8
ECA	12	$ 520	$ 88.4
LAC	6	$ 190	$ 37.6
MNA	2	$ 44	$ 9.2
SAR	3	$ 146	$ 30.7
Global	4	$ 281	$ 38.2
TOTAL	42	$ 3,370	$ 382.2

Notes: This includes all Bank and IFC projects that have entered the GEF pipeline, including MSPs.

ECA. The ECA Region was not active the GEF EE program until fairly recently, in part, due to a fairly robust demand for Bank lending for EE driven by ongoing reforms and rehabilitation of the district heating systems as well as necessary demand-side measures and metering needed to allow such reforms and market-based pricing. Many of these countries are also sensitive to environmental concerns, with a number seeking EU membership. Recently, with reforms progressing, countries in the region have begun looking for more market-oriented programs, creating ESCOs within utilities (Poland, Croatia) and EE financing programs (Romania, Lithuania, Croatia and Poland). The need to address the financing barrier is expected to continue in new operations in Serbia & Montenegro, Bulgaria and Macedonia. IFC has been very active in the region, with lighting programs in Poland, the Czech Republic, Hungary and Latvia and the first GEF loan guarantee program in Hungary (HEECP). IFC also recently launched a five-country EE loan guarantee program (CEEF) in Czech Republic, Slovak Republic, Estonia, Latvia and Lithuania. Moving forward, there remains huge potential for energy savings in the residential housing block sector within the region, although viable business models may need to be further developed if GEF resources are to be mobilized.

LAC. EE programs in Latin America have had a much more consistent involvement by power utilities than other regions, which is, in part, due to the advanced state of sector reforms in several countries. The Bank has initiated several DSM programs with GEF support (Mexico, Jamaica, Brazil, Ecuador) and a new project in Uruguay. While these programs include major roles for the utilities, the more recent programs also include provisions for more private sector participation and commercial financing. These programs have had many positive impacts, although their longer-term viability has yet to be demonstrated. In addition, recent financial and energy crises in some of these countries have shifted government priorities away from such efforts. IFC has initiated lighting programs in Argentina and Peru and is considering some financing programs. Over the coming years, substantial opportunities will still remain for large-scale programs in the region, focusing on financing and power sector regulations and replication of successful schemes in neighboring countries.

SAR. Considering its potential, the GEF EE program in South Asia has been disappointing. Aside from a modest utility DSM program in Sri Lanka and EE credit line in India, little else has been implemented. The major issue facing India has been the lack of meaningful progress on power sector reforms, which severely inhibits proper incentives for EE and the sustainable market development for EE products and services, although industrial tariffs are high. On the other hand, it appears that the stalled reform agenda requires significant and simultaneous changes from three

groups (government/regulator, utilities and end-users) in order to move forward. Thus, while EE cannot address this systemic problem, it seems that a comprehensive solution cannot be formulated without considering and addressing the demand-side of the equation. Two new activities have been proposed in India in this regard, one dealing with agricultural pumpsets (which is linked to reforms) and the other with EE policy (linked to the recently approved Energy Conservation Act); progress with both these initiatives, however, has been very slow.

MNA. The MNA Region has also not been very active in developing GEF EE programs. Two activities have been initiated to date, an MSP in Morocco to promote ESCOs and a larger proposed EE/ESCO financing program in Tunisia. A similar operation is now under development in Algeria. All of these programs have focused exclusively on the industrial sector, which accounts for an overwhelming portion of the energy use and savings potential. As further experiences are gained, similar modalities can be applied to other sectors within these countries as well as neighboring ones.

AFR. Sub-Saharan Africa has the smallest GEF EE program. There have been some expressions of interest for small projects, in end-use efficiency, but the small sizes and numbers have prevented any economies-of-scale. Electricity tariffs are well below the cost recovery threshold and per capita energy use is low. Project partners are limited: the public sector has limited capacity and the relatively small markets may not attract much private sector interest. Two activities have been initiated to date, an ESCO development MSP in Cote d' Ivoire and a proposed DSM project in Burkina Faso. IFC is supporting a lighting program in South Africa. While there may be no clear potential for any large-scale programs in Africa, future GEF programs could be developed to address energy use in public buildings, and some targeted DSM in areas where it is cost-effective for the utility.

III. Implementation Experiences

Implementation of the GEF project portfolio has been generally satisfactory, with only three projects (out of 29 under implementation) rated as unsatisfactory[1]. A major issue with all EE programs has been their particular vulnerability to macroeconomic conditions and international energy prices. Macroeconomic shocks affect energy demand, equipment sales, financing and credit, which can in turn reduce incentives and prioritization of EE investments (Thailand, Brazil). Changes in international energy prices also affect customers long-term view of EE investments (Jamaica), particularly for fuel-switching investments. Other commonly cited implementation issues have included unclear coordination and delineation of responsibility for various EE programs among various government agencies and lack of high quality and consistent project implementation unit (PIU) staff/management. And, some common issues, which are not limited to EE projects, have been the lack of strong local ownership, sound project management, realistic implementation and procurement timetables, sufficient counterpart funding and project readiness.

Other implementation issues identified have been specific to the various models of the EE programs. For the purposes of this review, five basic EE program models have been identified. These include utility DSM, market transformation, ESCO development, EE financing and supply-side improvements. In addition, all models have included complementary activities, such as training and marketing, which are also briefly discussed. Given the growing size of the EE financing portfolio, this model is discussed in more depth. However, the supply-side program, which only includes three operations (two under the first wave of GEF projects), does not have sufficient experiences from which to draw meaningful lessons and, thus, it is not discussed as part of this review.

Utility DSM

Since the Bank is already engaged in the power sector and has established relationships with many utilities, placing an EE program within a utility has been a logical choice for many operations. Some 16 projects have included DSM aspects within their designs. Key implementation issues associated with these programs have included mixed incentives for utilities to implement DSM, inconsistent management support of DSM, frequent PIU management/ staffing changes, improper skills mix within DSM units, subsidized tariffs, sector reforms which can affect the medium- to long-term institutional arrangements for DSM, unfair competition with existing private sector companies, unclear implementation arrangements, changing energy consumption patterns which could affect peak periods, coincidence factors and equipment operation, poor or inadequate upfront program and evaluation planning, and uncertain prospects for program sustainability. (Key Bank/GEF Projects - Closed: Thailand, Mexico, Jamaica, Sri Lanka; Ongoing: Brazil, Lithuania, Vietnam; Proposed: Uruguay, Burkina Faso)

While many of these programs did achieve their intended goals, the broader issue of sustainability is an area of particular concern. While it can be argued that most of the energy savings will persist years after the GEF project is completed, and some markets permanently shifted, it is less clear whether further DSM program implementation by the utilities will continue. Prospects for sustainability can be much improved by proper attention to three key issues: (i) Does the utility have the incentive (either through regulation or cost recovery both for program costs and lost revenues) to implement such programs? (ii) Does the utility/regulator have the necessary staff and

[1] These include the Russia Greenhouse Gas Reduction (closed), Brazil Energy Efficiency (restructured) and IFC's Renewable Energy and Energy Efficiency Fund (REEF) (being restructured) Projects.

skills to evaluate such programs? and (iii) Does the program include provisions to sustain itself through ongoing and planned sector and pricing reforms?

Other lessons learned highlighted in project ICRs and MTRs have included:

- A supportive policy environment, including proactive commitment by government and major energy sector players, is essential for successful DSM programs;
- Early, visible successes improve government and public support for continuing such activities;
- While not a precondition for DSM, electricity tariffs should reflect long-run marginal costs;
- DSM programs should be complemented with financing programs, such as revolving funds for residential users and parallel financing programs for commercial/industrial customers;
- Well-designed public awareness campaigns are critical to DSM program successes; and
- DSM units must have managerial and financial autonomy.

Eight lessons learned were also highlighted in a 2000 ASTAE/ESMAP Paper[2] on the Thai DSM Program, the largest in the GEF portfolio, which include: (i) design DSM programs based on local cultural context; (ii) identify and recruit DSM champions early on; (iii) clearly define DSM program objectives to avoid mixed goals and potential business conflicts; (iv) establish DSM programs and institutional/funding arrangements in the context of ongoing and planned sector reforms; (v) where possible, distribution companies should be heavily involved to make use of their established brand recognition and customer relationships; (vi) encourage systematic program planning and evaluation; (vii) phase implementation, to allow for a gradual build up of DSM program portfolio and scale-up of successful pilots as appropriate; and (viii) develop parallel financing facilities to support audit and other programs targeting industrial and commercial customers.

Market Transformation

About 24 projects have dealt with improving the efficiency of one or more products, through a wide variety of models such as technology transfer, marketing, utility DSM, subsidies, labeling, codes and standards, manufacture negotiations, financing and bulk procurement/market aggregation or a combination of them. Key implementation issues associated with these programs have included technology credibility (due to poor quality products), socioeconomic instability, protection of local manufacturing, limited capacity to enforce standards/codes, credibility of product labels, underdeveloped institutional and implementation arrangements, unrealistic timetables to develop new markets, concerns over market aggregation leading to monopolistic markets, effectiveness of static project designs in dynamic markets, poor quality power, lack of sufficient consumer education, underutilized and underfunded testing laboratories, insufficient attention to important auxiliary equipment and questions of program sustainability. (Key Bank/GEF Projects - Closed: Thailand, Mexico, Jamaica; Ongoing: China, Brazil, Thailand, Vietnam, Mongolia; IFC: Poland, Argentina, ELI) It should be noted that there is not consensus among Bank TTLs that such types of programs are within the Bank's comparative advantage given the lack of complementary investment financing needs. UNDP, which is more suited to technical assistance (TA) programs, may be a more logical partner and, in fact, UNDP has done a lot in this area, mostly on lighting, motors, refrigerators and buildings. While IFC has supported this model under ELI, IFC has concluded that such programs are not within its comparative advantage and is unlikely to pursue similar programs in the future.

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[2] Singh, J., Mulholland, C. "DSM In Thailand: A Case Study," ESMAP Technical Paper No. 008/00, October 2000.

Given the wide range of strategies employed under this program model, it is difficult to summarize key experiences. Clearly, the use of market mechanisms to promote certain technologies or EE products has the best prospects of sustainability as it allows market actors to make decisions based on a product's commercial merits. However, where market imperfections exist or the government desires a strong push, well-designed interventions can be very effective. Such programs should be sensitive to the need to improve local manufacturing capabilities as well as enhance competition. Introduction of voluntary mechanisms first (labels, voluntary standards) before moving to mandatory labels and standards is also generally accepted good practice. Judicious use of subsidies can help stimulate markets and facilitate recruitment of participating manufacturers, but such interventions should be restricted to promotional periods and target market segments, and explicit sunset provisions included. Enforcement, when necessary, should be effective and efficient. And, well designed marketing efforts can be critical to bridge the gap between supply and demand.

Other lessons learned have included:

- Minimum program product technical specifications can help improve technology credibility;
- Program designs should be sufficiently robust and flexible to allow for changing market conditions;
- Market interventions and marketing efforts should be sensitive to the local environment;
- Public education campaigns involving local government, NGOs and schools can be effective;
- Non-energy saving benefits of EE equipment can also be effective in marketing campaigns;
- Evaluation plans should consider not only market changes but also larger changes, such as macroeconomic changes, energy use patterns, policy changes, etc.;
- EE programs that have less quantifiable benefits, such as general market awareness, should have appropriate measures for monitoring developed and agreed at project design stage; and
- Some plans to evaluate markets sufficient periods after GEF project completion is needed to measure long-term impacts and sustainability.

Eight fundamental design principles were also recommended in a recent GEF Working Paper[3], which include: (i) target both supply and demand sides of a market; (ii) take a holistic view of the market; (iii) leverage competitive market forces when possible; (iv) build flexibility into program design; (v) consider vehicles for TA and transfer of know-how that will be workable; (vi) emphasize standards, labeling and building codes; (vii) allocate a portion of the program budget for activities that support replication and dissemination of results; and (viii) begin monitoring and evaluation early.

ESCO Development

About 24 operations have included components to develop ESCO markets in client countries. Some included development of utility-based ESCOs as an element of a DSM or financing program, while others supported the development of an ESCO industry. To date, a number of implementation hurdles have been faced with these efforts, including lack of equity sources for new ESCOs (particularly when offering off-balance sheet financing), legal and taxation issues associated with the ESCO business, inability for staff of new ESCOs to sufficiently identify,

[3] Birner, S., Martinot, E. "The GEF Energy-Efficient Product Portfolio – Emerging Experiences and Lessons," GEF Monitoring and Evaluation Working Paper 9, World Bank Report No. 24712, July 2002.

mitigate and manage risks, weak business and sales skills among ESCO staff, lack of access to ESCO project financing, overly complex energy performance contracts, creditworthy risks associated with many end-users, unfamiliarity of customers and banks to ESCOs, concerns over appropriate M&V needs, unclear procurement guidelines for selecting ESCOs for public sector projects, concerns over creating monopolistic ESCOs within utilities and major gaps between ESCO training programs and operating successful ESCO businesses. (Key Bank/GEF Projects - Ongoing: China, Brazil, India, Ecuador, Vietnam, Croatia; Proposed: Uruguay, Tunisia, Bulgaria)

ESCOs have been widely accepted by the Bank as an attractive business model for bridging the gap between end-users and financing. It involves private sector participation and financing, allows technical risks to be transferred away from end-users and financiers, and includes inherent business incentives for ESCOs to proactively develop projects. ESCOs can also specialize in packaging smaller EE projects, bundling procurement of goods across several projects and taking on project performance and credit risks. Thus ESCOs can be seen as a mechanism to remove many of the commonly cited barriers to EE investments. Despite these promising attributes, creating strong and credible ESCOs, not to mention full ESCO markets, has proven very challenging. Client countries often lack the legal and financial infrastructure to adapt to and support such business models. New ESCOs often lack the proper skills (corporate management, financial management and credit assessments, risk mitigation and management, sales) and thus have limited credibility to potential customers and financiers. Developing countries often have limited equity markets and investors willing to create new companies and test new business types. As further experiences are gained, the portfolio will hopefully offer new ideas and approaches to address some of these difficulties and help realize the vast potential that ESCOs can offer in developing sustainable EE markets.

ESCO Business Models. There are a broad range of business models that all ultimately lead to energy savings and, thus, merit consideration[4]. (See Text Box 1, next page, for a representative, but not exhaustive, list of ESCO business models.) Unfortunately, the concept of ESCOs is often misrepresented as one or two models, which may not work in many markets. This then leads to misunderstandings about what ESCOs can and cannot do without allowing sufficient market evolution and adaptation[5]. Specifically, it is often assumed that ESCOs always (i) provide full performance guarantees; and (ii) provide off-balance sheet financing. While this model would appear to be ideally suited to developing countries, the reality is that the lack of proper legal and financial infrastructure as well as the limited ability of local ESCOs to raise equity capital, secure sufficient project financing as well as their unwillingness and/or inability to take on and properly manage risks can make this "full-service" ESCO model unviable in the near- to medium-term.

Thus, to the extent possible, projects should seek to test a variety of ESCO models and assess which ones have the most potential for further development within a given market. Where possible, programs should be designed to support a variety of business models. However, given the limited amount of TA resources, the most promising models should be identified early and aggressively supported. Access to appropriate project financing, which would support a full range of ESCO transactions, should be an integral aspect of the project design. Use of demonstration projects, pilot ESCOs (including utility-based ESCOs), public sector ESCO procurement programs, use of utility programs to stimulate the market through super-ESCO arrangements (where they recruit customers and subcontract with ESCOs) can also be effective

[4] See also "GEF ESCO Thematic Review – Final Report," Draft GEF Working Paper, AEA Technology, April 2001.

[5] In Vietnam, for example, the project used the term 'project agents' rather than ESCOs to represent service providers. This has allowed agents to provide the types and range of services they wished to offer rather than forcing Western-style ESCO models on them. Under the project, agents include energy auditors, equipment suppliers, ESCOs, leasing companies, installation contractors, and engineering companies.

provided they (i) do not undermine the viability of a level playing field in the future; and (ii) are followed up with massive dissemination of information. Encouraging ESCOs to target all markets (e.g., public, industry, buildings, residential) offers a more complete program, allows ESCOs to specialize and improves prospects for strong project pipelines.

Text Box 1. Examples of Different ESCO Business Models
(The list ranges from the full-service/high risk contracts to low service/risk)

Full-Service ESCO: The ESCO designs, finances and implements the project, verifies energy savings and shares an agreed percentage of the actual energy savings over a fixed period with the customer. This is also referred to as the 'Shared Savings' approach in the U.S.

End-Use Outsourcing: The ESCO takes over operation and maintenance of the equipment and sells the output (e.g., steam, heating/cooling, lighting) to the customer at an agreed price. Costs for all equipment upgrades, repairs, etc. are borne by the ESCO, but ownership typically remains with the customer. This model is also sometimes referred to as Chauffage or Contract Energy Management.

ESCO w/ Third Party Financing: The ESCO designs and implements the project but does not finance it, although it may arrange for or facilitate financing. The ESCO guarantees that the energy savings will be sufficient to cover debt service payments. This is also referred to as Guaranteed Savings in the U.S.

ESCO Variable Term Contract: This is similar to the full-service ESCO, except that the contract term can vary based on actual savings. If actual savings are less than expected, the contract can be extended to allow the ESCO to recover its agreed payment. A variation is the 'First Out' model, where the ESCO takes all the energy savings benefits until it has received its agreed payment.

Equipment Supplier Credit: The equipment supplier designs and commissions the project, verifying that the performance/energy savings matches expectations. Payment can either be made on a lump-sum basis after commissioning or over time (typically from the estimated energy savings). Ownership of the equipment is transferred to the customer immediately.

Equipment Leasing: Similar to supplier credit, the supplier receives fixed payments from the estimated energy savings. However, in this case the supplier owns the equipment until all the lease payments, and any transfer payments, are completed.

Technical Consultant (w/ Performance-based Payments): The ESCO conducts an audit and assists with project implementation. The ESCO and customer agree on a performance-based fee, which can include penalties for lower energy savings and bonuses for higher savings.

Technical Consultant (w/ Fixed Payments): The ESCO conducts an audit, designs the project and either assists the customer to implement the project or simply advises the customer for a fixed, lump-sum fee.

Other lessons learned include:

- Projects appear to have best success when a variety of ESCO business models are introduced and those most promising, and of interest by local stakeholders, supported;
- Equity issues of new ESCOs need to be explicitly addressed if off-balance sheet financing is to be promoted;
- Utility-based ESCOs represent an attractive option when the private sector is unwilling to accept prevailing market risks;
- Parallel financing programs are critical to address the project finance barrier of ESCOs, but such facilities should support multiple transaction and financing models; and
- Complementary efforts to promote an enabling policy and business environment, such as fostering of business associations, can improve impacts and allow for constituency building.

The GEF ESCO Thematic Review, which included 12 GEF Bank, IFC and UNDP ESCO projects, assessed progress and trends in ESCO projects. Emerging lessons cited were: (i) projects should consider a complete and phased plan for market development; (ii) energy pricing policies are critical to ESCO development; (iii) large-scale, multi-donor, long-term funding may be required to develop ESCO markets; (iv) ESCOs require key technical and entrepreneurial skills; (v) active supply of EE equipment is essential to ESCO development; (vi) ESCO markets require educated end-users and financiers; (vii) managerial and cultural factors should be understood and account for; (viii) local banking sector should be closely involved; (ix) legal and taxation issues should be addressed; (x) projects should develop sustainable institutions and companies; (xi) ESCO programs should seek to offer viable business models for all markets and projects; and (xii) specific target markets can provide a strong base for ESCOs.

Complementary Efforts

All of the EE projects in the review included complementary TA components to help ensure achievement of the project objectives. While some of the activities were specific to a particular operation, a number of common activities were observed, including: (i) marketing; (ii) training; (iii) information dissemination; and (iv) market and pipeline development. In most cases, it was difficult to properly assess how the various TA activities actually contributed to the project outcomes or whether the specific activities really met their intended objectives, since these activities did not always have measurable indicators. However, a number of general findings were noted, as summarized below:

- Marketing efforts should be designed with due consideration to local cultural norms and traditional media channels;
- Where possible, marketing efforts should also include upfront indicators for assessing their success, cost-effectiveness and include interim feedback mechanisms for periodic adjustments;
- Training programs should consider a blend of lecture-style training with case studies and hands-on activities as well as more customized, one-on-one training;
- Training programs geared for new ESCOs should include a major focus on financial management, risk management, bank application preparation and project selling;
- Information dissemination and case studies should highlight both technical and financial aspects of successful projects and be designed to influence financial decision-makers;
- Informational programs should include upfront indicators for assessing their overall effectiveness, including tracking investments and changes that directly resulted from them. Use of performance-based remuneration to information agencies has shown some success;
- Market and pipeline development is a very difficult business. Projects should seek multiple channels for originating projects, develop strategic partnerships with national associations, other government/donor TA programs and NGOs, consider customer bidding schemes to draw in new ESCOs and generate additional projects, etc.;
- All such TA efforts should have clear sources of financing identified to sustain them after the GEF funds have been exhausted.

Given the amount of GEF resources allocated to these tasks within the portfolio, and noting that such activities are not limited to EE projects within the GEF portfolio, the overall effectiveness of such efforts merits further study.

IV. Energy Efficiency Financing Programs

Financing is often determined to be a key barrier to the wide-spread adoption of EE technologies and development of service and product markets. Since typical EE investments have unique characteristics, they tend to fall outside traditional financing programs and thus justify special attention. Some of these features include: relatively small investments (high transaction costs), high upfront project development costs, no production expansion or new product development (i.e., no new revenues generated), benefits can be small relative to overall operating costs (high opportunity cost for end-users), inherent perceived risks associated with new technologies and practices, no corresponding asset for ESCO payments (for accounting purposes) and lack of bank understanding of EE financing modalities, risks and the ESCO business. The creation of dedicated EE financing facilities using GEF funds is still a relatively new venture. About 28 projects involving EE financing have now entered the portfolio, although less than half actually involve dedicated GEF financing programs and only a handful to date are operational. (Key Bank/GEF Projects - Ongoing: China, India, Thailand, Romania, Lithuania, Croatia; Proposed: Philippines, Poland, Uruguay, Tunisia, Bulgaria, Serbia & Montenegro, Macedonia; IFC: REEF, HEECP, CEEF, Russia, EECF)

Project Development and Audit Costs

Before an EE project can reach the financing stage, the project development barrier must first be addressed, i.e. securing technical expertise and necessary funding for preliminary and, subsequently, investment grade audits. While in some cases, such studies are done in-house, particularly in industry, they may not have both a full range of technical expertise and know-how and the time and inclination to do so. Since it is not known at the outset whether or not there will be an investment project with sufficiently attractive returns, this represents a major risk to both the project developer and end-user. In developed markets, it is general practice for the ESCO to conduct the audit and then, if suitable investments are identified and the customer proceeds with the investment, incorporate the audit costs to the full project financing package. In the event that no investments are found, the ESCO would absorb the audit cost; in the event that attractive investments are identified but the customer opts not to proceed with the project, then the customer would bear the audit costs. In developing country contexts, this arrangement is not always practical. New ESCOs are often unable to bear upfront audit costs and customers are reluctant to accept any commitments without knowing if good projects will be identified. For these reasons, overcoming audit costs has been a major challenge with EE projects worldwide.

A number of interesting strategies are now being tested in recent Bank/GEF EE projects to overcome the audit cost barrier (see Text Box 2, next page). In underdeveloped markets, audit support can greatly facilitate initial projects that can then be used as case studies for further replication. In such cases, proper and efficient administration is critical and program safeguards may be needed to avoid creating incentives for customers not to proceed to the investment stage. Where possible, audit support should be partial and a portion held until the customer agrees to implement the project. With all such options, the appropriate intervention must be determined based on an in-depth analysis of country and market conditions, critical transaction barriers, current ESCO practices and availability of resources. Where the opportunities for high return EE investments exist, the audit cost barrier may not need to be addressed.

It should be noted that a number of client countries are now considering (e.g., Vietnam, Mongolia) or have already enacted (e.g., Thailand, India, Tunisia) national energy conservation laws. In most cases, these laws call for mandatory audits of all facilities with over a certain energy consumption threshold. In some cases, these mandatory audits are supported with

government grants and subsidies for such audits. While most of these programs are still relatively new, the results to date are not promising. Legislated audits have tended to result in customers and auditors/ESCOs conducting audits solely to satisfy legal requirements. Incentives have led to audits to satisfy the law, with little attention to quality, comprehensiveness or commercial viability. Further, government agencies are faced with approving hundreds of audit reports and often lack the capacity to adequately do so. Many of the laws further require customers to implement all commercially viable investments identified in the audit reports, which can create incentives for customers and their auditors to find no such investments (so there is no need for further compliance). Thus, while the spirit of these laws may be in the right place, there is a growing consensus that a focus on commercial approaches tends to provide better aligned incentives for all parties.

Text Box 2. Options to Overcome Audit Cost Barrier

ESCO/Customer Pays: In developed markets, the ESCO pays upfront for the audit. If no project is identified, the ESCO absorbs the audit cost; if a viable project is identified but the customer does not invest then the customer reimburses the ESCO for the full cost of the audit; if viable measures are identified and the project proceeds, then the cost of the audit is included in the total financing package. (U.S., Canada)

Contingent Loans: Under this arrangement, the GEF grant administrator would lend funds for the audit costs. If the project leads to an investment, then the audit loan is included in the project financing package; if the audit does not lead to a project, then the audit loan is converted into a grant. (Croatia, Uruguay)

Audit Grants: Full or partial grants for energy audits can help identify a pipeline of EE projects. This option is particularly useful in the early stages of market development, as it allows ESCOs to gain hands-on experience without risk to themselves or their customers. (Vietnam, Tunisia, Thailand, Poland)

Product Lines: This approach relies on ESCOs reviewing a single technology or system, rather than the full facility. The advantage is that it reduces upfront audit costs and can allows ESCOs to specialize. The downside is that it does not encourage a bundling of measures, which could lower overall transaction costs and lead to more energy savings. (China)

Project Phasing: Where access to financing is limited and ESCOs are new, phasing of projects can allow reduced upfront audit costs, transaction models to be tested, lower risks for all parties and some incremental improvements on the part of ESCOs based on previous phases. It can also allow energy savings from the first phases to be used to finance subsequent phases. However, as with the product line approach, some natural economies–of-scale and bundling opportunities could be lost. (Vietnam)

Even with effective mechanisms to address the audit cost barrier, it is essential that projects be designed to maximize the percentage of audits that lead to investments. This is necessary to ensure that a full audit/investment market is developed and ensures that limited GEF resources are used most efficiently. Efforts to engage key decision makers, such as CEOs and CFOs, and seek agreement on minimum rate of return thresholds for EE projects prior to the audit can help ESCOs other project developers screen potential customers. Other ESCOs have used two-part contracts or memoranda of understanding (MOUs) to tie the audit to a subsequent project or simply required some cost sharing of the audit to help 'weed out' marginal customers. Regardless, future projects must explore all options to maximize their investment to audit ratios and include any necessary provisions within the project design.

Financing Instruments

There are a wide array of instruments and models to support the development of EE financing programs. A number of countries have considered or even implemented national energy conservation funds, which often include debt financing windows; unfortunately their overall performance (in terms of total lending, energy savings, defaults) has been mixed. Results with

EE credit lines has been similar. Common problems have included their lack of commercial approach, proper incentives for the intermediary to proactively market the program, a lack of technical intermediary skills and suitable mechanisms to identify and package projects. In some cases, project criteria have been too tight; in other cases, the lender had little incentive to lend or take on end-user credit risks; still others do not offer appropriate loan terms to be paid from energy savings.

Shortcomings of these past interventions has led to the recent creation of a number of new, more innovative financing mechanisms, largely funded by the GEF. A summary of instruments that have been used or considered to date is summarized below:

- Partial Loan Guarantees. GEF funds are placed into a reserve account that is then used to underwrite partial credit guarantees for EE loans to end-users, ESCOs and equipment suppliers. For Bank projects, a local financial institution (FI) is selected to serve as the project guarantor; IFC acts as the guarantor for its programs. Some projects require the guarantor to enter into guarantee framework agreements (GFAs) with competitively selected banks, committing a portion of the guarantee fund to each bank (Hungary, Croatia, Poland); in other cases, the guarantor is free to work with any bank (China, Philippines). Most often, the guarantor serves as the administrator of the reserve account, issuing guarantees based on predefined criteria and appraisal methods. However, in a few cases, the guarantor is required to leverage the reserve account with its own funds (Poland, Philippines, IFC); in all these latter cases, the GEF funds are in a first loss position vis-à-vis the guarantor funds. The program earns income from interest from the reserve account balance along with guarantee fees, which can help offset operation costs and initial defaults. Other projects considering such instruments include Tunisia, Bulgaria, Macedonia and Algeria.
  Conditions: Such instruments are most appropriate in well-developed banking sectors, where banks are liquid and willing to accept some risks, and when there is sufficient baseline market activity to justify and support the program. These instruments are only meant to help share project financing risks, marginally enhance credit and improve loan terms; they cannot solve systemic banking or credit problems.
- Loan Loss Reserve Funds. GEF funds are deposited into an account with participating bank(s) to provide full or partial coverage for a portfolio of small EE loans, usually where individual loan guarantees are not appropriate. In IFC's Hungary program, such an instrument was used to cover a portfolio of small residential loans. Participating banks contributed 4 percent of the total loan portfolio amount and GEF provided 11 percent; if defaults exceed 15 percent, the bank bears the incremental loss. A loss reserve fund is also included in the Croatia project for the utility-based ESCO.
  Conditions: As with guarantees, such an instrument is well-suited for developed and liquid banking sectors, where banks are able and willing to take some risks. It is better suited for a portfolio of small, standard loans and thus should be accompanied by appropriate TA to develop standardized loan applications and appraisal methods.
- Special Purpose Funds. Dedicated credit lines and/or revolving funds, either public or private, can facilitate access to EE project financing as it effectively removes the need for EE projects to compete with conventional projects for commercial financing. In some cases, the funds finance a large portion of the investment (Thailand, Lithuania); in other cases, fund managers are encouraged to leverage the GEF funds with commercial financing (Romania, Uruguay). For the latter, GEF funds can be placed in a first-loss position to the commercial funds in order to reduce risks to the co-financiers in the early years. Most of these projects rely on a proactive fund manager to originate new projects, recruit co-financiers and facilitate transactions. In a few cases, a separate 'bridge

financing' window has been established, typically to support investment grade audits and initial projects until banks are willing to begin lending, even if they have access to a guarantee program (Croatia, Algeria). Initial projects supported using these bridging loans could be refinanced by commercial banks after commissioning and thus serve as a means to bring new banks into the EE financing business.
Conditions: Such options are more appropriate where there is insufficient liquidity in the banking sector or where there is major risk aversion among lenders. Funds can be used to develop a critical mass of EE loan and project performance data which banks can then use to better assess and price risks associated with EE investments. In such cases, TA to effectively disseminate this data is essential. Such instruments can also serve a public policy goal of aggregating EE loans in one program to better track its performance, environmental benefits, provide incentives, etc.

- Equity Funds. In a couple of cases, the Bank has provided GEF funds as equity to ESCOs (China, Uruguay); but such investments are uncommon and can raise equality, divestment protocol and legal concerns. IFC established REEF in 1997 to provide equity (and debt) support for EE (and renewable energy) projects, but the fund was unable to perform as hoped. Some reasons cited included: (i) equity funds typically require high rates of return with secure exit in 7-10 years, which is difficult in sectors with high competition from traditional technologies; (ii) the timing of REEF's launch occurred before the global energy sector saw a huge reduction in private sector inflows; (iii) many projects required both equity and long-term debt, the latter being more difficult to access; and (iv) managing a global equity funds is challenging. While project and ESCO equity remain key barriers, this instrument does not appear to be viable in the near-term.
  Conditions: In cases where ESCO and project equity constraints are major barriers, such an instrument, if properly designed, could be an option. Project returns would have to be high and debt financing would have to be secured in parallel.
- Investment Grants. While not addressing the financing barrier per se, subsidies or investment grants (bonuses) can help facilitate investments on the end-user side by improving cash flow and reducing risks. Such instruments can also be useful in stimulating the market (Vietnam, Tunisia), providing demonstration case studies and initial project performance data (Vietnam, Tunisia), deepen EE retrofits within a given project (Poland), reduce high cost investment barriers with new technologies (Poland) and/or address social objectives (Lithuania).
  Conditions: This can be an appropriate option where the credit barrier is too high to support commercial financing or the banking sector is underdeveloped. It can also be developed in concert with other instruments, provided that one instrument does not undermine the other. To the extent possible, such programs should target new and underdeveloped markets rather than compete with existing commercial activities and financing. Such programs must be efficiently and effectively administered in order to prevent creating new bureaucratic barriers to the market, include sunset provisions once the grant objectives have been achieved and support the intensive dissemination of initial transactions.

Table 3 (pp. 16-17) includes a summary of approved and proposed GEF-supported financing programs over the FY97-04 period. As shown in the table, only five programs are actually operational and three of these are just getting underway; the rest are still under preparation. Thus, while there is a need to glean lessons learned from these early projects now to enhance the projects under preparation, it must be stressed that the sum of experiences to date still very limited.

Table 3. Specific Parameters for Various GEF Financing Programs (FY97-FY04)

Country	Fund Manager (Reserve Amt) Capacity	Financing Instrument	Typical Project Size	Financing Charges	Typical Loan Terms (years)	Use of GFAs	Other Notes
Hungary Tranche 1 (pilot) approved 3/97 Tranche 2 approved 10/01	IFC ($4.25m GEF, $12m IFC) Capacity: $91.5m	1. Partial (up to 50%) credit guarantee, GEF funds in first loss position 2. Loss reserve fund (up to 11%) for portfolio of small loans	1. $500k max of guarantee liability 2. $300-$1,000	Guarantee fee (GF): 1 %	1. 3-7 years 2. 1-2 years	Yes	The pilot provided up to 50% guarantee, HCEEP 2 offers only 35% guarantee. IFC is considering changing terms for renewed GFAs in 2004 to 50% pari passu guarantee.
Thailand Approved 6/01 Effective 10/01	International Finance Corp. of Thailand ($2.5m GEF, $2.5m MLF) Capacity: $5m	Contingent loan fund	$200k-250k	Onlending rate (OR): 0 %	7 years	No	Finances chillers only, balance repaid to Bank/GEF in Thai Baht
Romania Approved 9/02 Effective 2/03	Romanian Energy Efficiency Fund ($8m GEF) Capacity: $63m	Revolving fund, up to 80% of project cost	$100k-$1m	OR: LIBOR + 3.5-8.5%	1.5-4 years	No	Forex risk borne by borrower, 1% (of loan amount) finder's fee payable upon deal closure
China Approved 10/02 Effective 6/03	China National Investment & Guarantee Co. ($22m GEF) Capacity: $250m	Partial (up to 90% initially) credit guarantee	$300k-800k	GF: 1-3.3%	1-3 years	No	
CEEF (Global)[1] Approved 10/02	IFC ($15m GEF, $30-75m IFC) Capacity: $90-180m	Partial (up to 50% initially) credit guarantee, pari passu with FIs, GEF in first loss to IFC funds	$500k max (streamlined) $1.88m max (non-streamlined)	GF: Market rate	7-8 year max	Yes	
Lithuania Approved 6/03 Not yet effective	TBD ($3m GEF) Capacity: $3.8m	Revolving fund, up to 80% of project cost	$2-100k	OR: Market rate	TBD	No	Includes windows for both individual and home owner association loans.
Croatia Approved 10/03 Not yet effective	Croatian Development Bank (HBOR) ($1.2m GEF) Capacity: $5.5m	Partial (up to 50%) credit guarantee	$500k max	GF: 1% + 0.25% application fee	10 year max	Yes	Project also includes contingent grants, bridge financing and loss reserve fund for utility ESCO

Country	Fund Manager (Reserve Amt) Capacity	Financing Instrument	Typical Project Size	Financing Charges	Typical Loan Terms (years)	Use of GFAs	Other Notes
Philippines[2] (proposed)	Local Government Unit Guarantee Corp. ($10m GEF, $20m LGUGC) Capacity: $50m	Partial credit guarantee, GEF in first loss position	$2.5-3m max	GF: 1.5% + 1% application fee	15 year max	No	Lending to rural electric cooperatives (ECs) (up to 80% guarantee coverage) and EC investors (up to 50%).
Russia (proposed)	IFC ($2m GEF, $3-13m IFC) Capacity: $50m	Partial guarantee facility, GEF in first loss position	TBD	TBD	3-7 years	Yes	Maximum guarantee % not yet determined; guarantee may be operated in concert with IFC EE credit lines..
Uruguay (proposed)	TBD ($1.7m GEF) Capacity: $9m	Revolving fund, GEF co-finances up to 90% of loan amount, GEF in first loss position	$80k-200k	OR: 12%	1-3 years	No	UEEF can finance up to 90% of off-balance sheet ESCO projects or 75% of (end user) on-balance sheet projects.
Poland (proposed)	Bank Gospodarstwa Krajowego ($7m GEF, up to $14 BGK) Capacity[3]: $39m	Partial (up to 50%) credit guarantee, GEF in first loss position	$500k max	GF: 1.2-2.0%	10 year max	Yes	BGK will maintain initial leverage ratio of 1.5 to 1. At Year 3, if the program is progressing well and defaults are under 15%, then BGK will extend the leverage to 3:1.
Tunisia (proposed)	TBD ($4m GEF) Capacity: $8m	Partial (up to 50%) credit guarantee	$200k average	GF: 1.5%	3 years	No	Guarantee is limited to ESCOs for industrial sector only

Notes:

1. Includes Czech Republic, Slovak Republic, Estonia, Latvia and Lithuania.
2. Project data for all proposed projects are subject to change as the project details are finalized during appraisal/negotiations.
3. $2m of capacity set aside for utility ESCO.

Selecting the Appropriate Instruments

While many countries may note that there is a lack of available financing for EE within their markets, and thus correctly highlight lack of financing as a key barrier, it does not automatically follow that a guarantee facility or fund is the most appropriate intervention strategy. In some cases, there may be a need to first build the project development side of the market, through ESCOs and other business models, to stimulate basic market activity, package projects and create a demand for financing. In other cases, banks may be willing and able to lend, provided they have access to some TA on how to technically appraise EE projects and assess their risks. In cases where there are only a limited number of creditworthy customers, perhaps focusing on public sector programs or some judicious access to grants and TA may be all that is warranted until the credit situation improves. IFC notes that some of the key issues with the EE financing barrier can be overcome with focused TA alone through (i) a more systematized banking business focus on EE market development; (ii) the development of specialized financial products to address EE investment niches, where a well-tailored financial product coupled with a streamlined appraisal process and complementary marketing efforts can facilitate deal flow; and (iii) hand-holding and brokering key partnerships between banks and project developers/ESCOs.

There are many ways to assess the market barriers and select the appropriate instruments. The key is to develop a systematic process to identify the barriers and establish strategies to overcome them. Figure 2 offers an example of a tool that may help guide future project teams on the thinking process that would typically be done before the various project components are defined. This tool is not meant to be followed mechanistically, but rather represents a guide to help establish a logical process in developing a financing barrier removal strategy. As further implementation experiences lead to an improved understanding of which strategies and instruments appear to be most effective and under what conditions, this or other tools should be developed and continually refined.

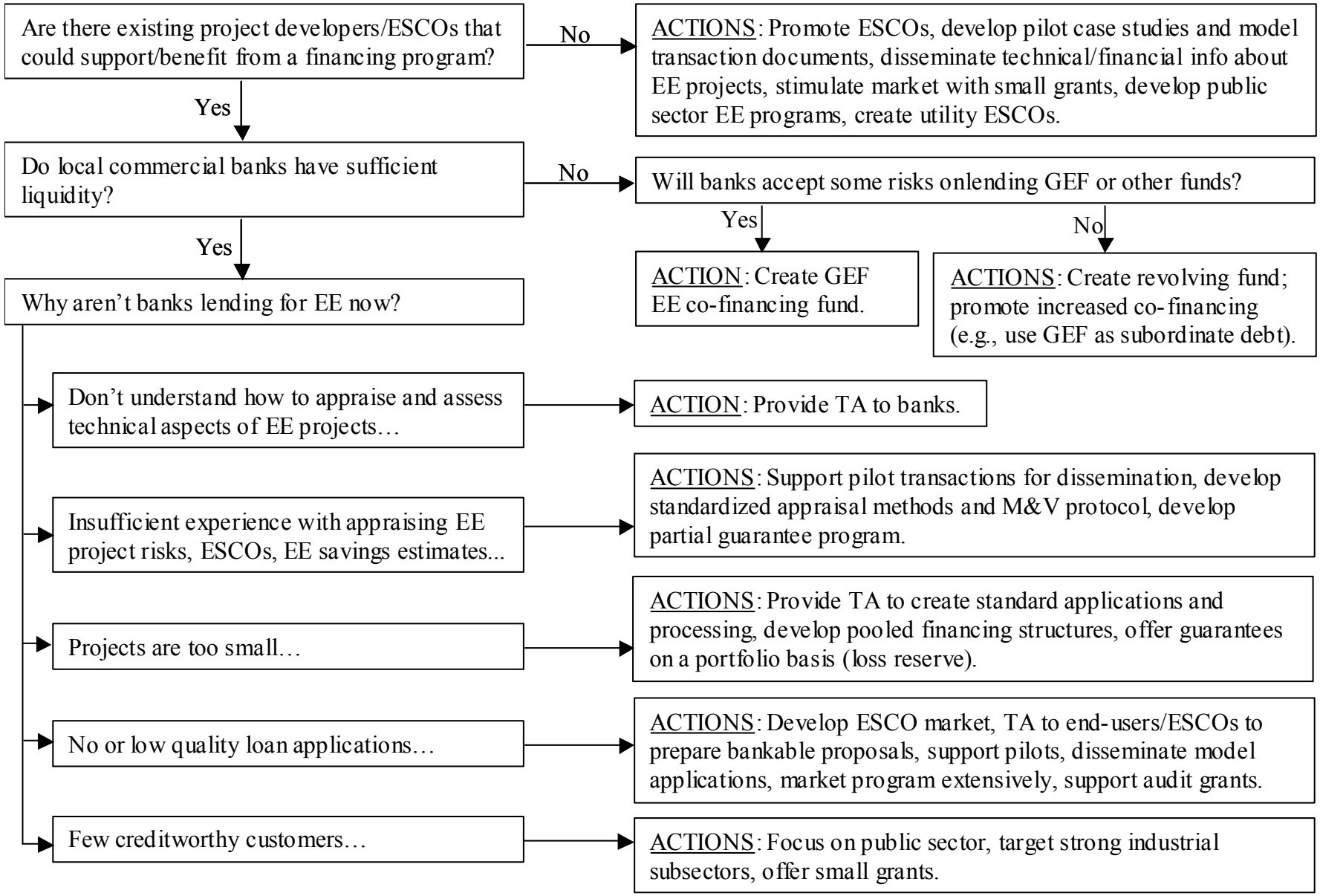
IFC has developed its own criteria for determining where such loan guarantees may be most appropriate. These include: adequate liquidity, attractive interest rates, reasonable competition and reasonably mature institutions in the capital markets. IFC notes that guarantees should be used to mobilize existing resources and are most effective where there is a real gap between the real and perceived risks by banks. There should also be available economically viable EE investments, which generally mean market energy pricing and interest rates below 20 percent. But they note that guarantee funds only address one element of the EE transaction, namely debt. It does not address equity constraints, either within the end-user or ESCO; it is not intended to deal with corporate debt issues, but focus on project finance; use of guarantee implies that the project debt is the key barrier to the transaction. Such instruments should not redefine the rules of lending or unduly distort normal lending practices; they must not make financially unviable projects or un-creditworthy customers attractive.

IFC has expressed concerns that the Bank may be overusing the guarantee instrument in a "one size fits all" approach. Further, IFC contends that the Bank has proposed introduction of some such programs in underdeveloped markets, has not consistently engaged commercial banks early enough and may not always sufficiently identify the specific market and financing barriers. Such instruments, IFC argues, if not properly selected and designed could serve to impede market development and, even worse, serve to harm the credibility of the GEF instrument itself.

Fund Sizing and Leverage

Another issue that needs to be considered is the appropriate size of the fund or guarantee reserve and its ability to leverage commercial financing. In the previous era of EE credit lines, EE

Figure 2. Sample Decision Tree for EE Financing Programs



technical and economic potential studies were conducted and the credit lines were generally sized based on estimated market penetration rates. These GEF financing programs, which generally rely on a more commercially-oriented approach, have not always included as much justification on their sizing. This can be partly attributed to the limited value of the earlier technical assessments, which often were unable to adequately estimate reasonable deal flow and were, thus, not reliable. In some cases, these GEF fund sizes have been based on an assessment of the capacity for existing and new ESCOs and other project developers to prepare and submit projects for financing, along with assumed growth rates in business and market activity. In other cases, the fund size was based on the perceived funding needed to generate sufficient credibility within the given market, which is more difficult to justify. Still others are based on the amount of GEF grant funds a project can justify given reasonable estimates for carbon dioxide emission reductions along with leverage assumptions. As more experiences are gained and more realistic deal flow assumptions can be developed, future projects should consider more rigorous methodologies for determining their sizes. In the mean time, it may be more prudent to consider undersizing or at least developing more conservative deal flow estimates over the near-term; successful funds can always find ways to increase their leverage ratios or be expanded with other donor/government funds; underutilized funds can harm both the credibility of the fund within a given market and the GEF products themselves.

The GEF Secretariat has increasingly viewed leverage potential as a key metric for assessing new project concepts, given the need for attracting more commercial financing with the GEF's limited resources. While this may be fair, it has understandably led to some 'leverage inflation' where each project promises slightly better leverage than the previous one, which in turn raise the GEF's expectations. The reality, though, is that deal flow has been substantially slower and more difficult that envisaged. Thus, while high leverage ratios are theoretically possible, no GEF EE financing program in operation has achieved a 1:1 ratio to date (total actual EE investments to GEF grant amount). Projects should continually seek to leverage commercial funding to the extent possible; but future projects may be better off focusing on market development and deal flow which will ultimately determine a program's success.

Results to Date

As many of these programs are just getting underway, actual results to date are still limited. (Text Box 3 provides some key indicators of the various programs under implementation.) However, determining the right indicators for measuring and reporting results is still under development. Simply reporting aggregate program guarantees issues does not represent those deals that are able to close without the guarantees, some of which the program may have supported through TA or earlier market development. Nor do such figures adequately represent how a program may have been able to leverage commercial financing, manage risks (i.e., defaults), ensure sustainability, or further impact the market with TA.

Reported impacts of IFC's HEECP offers some useful insights into other effects and market impacts from such programs. As a result of the Program, participating banks have reduced their collateral, down payments and equity requirements for EE projects. Many banks have been able to structure debt service to be fully covered from energy savings; others have allowed for portfolio management which further leverages funds and helps in risk management. Some banks have begun to finance projects based on future revenue streams, to invest equity in new ESCOs, to establish credit lines for specific ESCOs and to lend for demonstrated transaction models without purchasing the loan guarantee.

Text Box 3. Results to Date for Ongoing GEF EE Financing Programs

Hungary (HEECP): To date, a total of $5.6 million in total EE investments have been directly supported through the guarantee program, 5 signed GFAs for $16m in guarantee commitments, a probablized pipeline of $13m and $0 in loan defaults. These figures do not include investments that have occurred without guarantees or ones that only received TA support.

Thailand (Chillers): As of October 2003, IFCT had a pipeline of 29 loan applications and all 17 chillers under contract (about $3.4m) have been replaced.

Romania: As of December 2003, no transactions had been closed, although two proposals are expected to reach the investment committee within the coming weeks.

China: The fund went into operation November 12, 2003 and has closed three initial transactions ($360k). Four more are expected over the next month and the project still anticipates meeting its first year's investment target of $10m.

CEEF: As of December 2003, 5 GFAs have been signed with local banks and 3 more are under negotiation. These banks have closed three deals ($5.3m in total project costs) and identified a probablized project pipeline of $6.4m in EE investments.

Emerging Good Practice for Financing Programs

Based on this review, a number of good practices and underlying principles for such programs are emerging. While many of these may seem self-evident, putting them into practice consistently has proven to be challenging. As further implementation progress is achieved over the coming years, these recommendations will need to be further elaborated and refined.

1. *Conduct a full assessment of the EE market, from banks and project developers to equipment suppliers and end-users early in the project preparation process*. In addition to a review of overall macroeconomic and policy conditions, a holistic assessment of the market should be conducted. This review should include a review of the banking sector and its lending practices, credit availability for various sectors, project developer and ESCO capabilities and activities, equipment supplier product efficiencies and production capabilities, end-user capabilities and willingness to invest in EE and some indications of the potential for EE (e.g., technical, economic, financial, achievable).

2. *Identify critical barriers to the implementation of EE projects within the target market(s) and prioritize them*. Allocation of GEF resources within a project should be based on a well-defined prioritization of key barriers within the target sectors of a particular country. First, the market assessment should lead to a thorough analysis of those barriers that most critically inhibit deal flow for EE projects. (In some cases, generic EE barriers, such as lack of awareness of EE and ESCOs, high project development costs, etc. are overstated, perhaps because they are easier to overcome.) Projects that will have the most chance of successful outcomes are those that seek to explicitly address the most critical and difficult barriers to deal flow and market development, which may involve more difficult issues such as lack of ESCO equity, inability for new ESCOs to sell EE projects to end-users (close deals), common end-user biases towards production enhancements (revenue generation) rather than operating cost reduction investments, etc. Second, these barriers must be prioritized. One project need not, and probably should not, seek to remove all barriers at once. Sometimes, a sequencing of barrier removal efforts may be warranted; in other cases, the actual barriers may only be known once initial barriers are removed. It is likely that GEF resources will be inadequate to properly address the entire market at

once, so programs can be more effective if they can focus their objectives on those highest ranked barriers.[6]

3. *Select appropriate program interventions to address key barriers on a sustainable basis*. Too often, financing instruments are pre-selected at the concept stage, before sufficient market analyses have been conducted. Options to address the identified barriers must be developed and customized to the particular country or market. Where credit enhancement mechanisms are determined to be the appropriate instrument, issues of how credit can be improved on a sustained basis need to be addressed. In some cases, the guarantee program is determined to be a permanent need and, thus, the guarantee program must be designed as such, with appropriate institutional arrangements and cost recovery fees (and a willingness for the market to bear such fees). In other cases, it is expected that the guarantee program would generate sufficient market data on EE loan performance so that commercial banks could begin pricing such financing without further guarantees; in such cases, a clear exit strategy for the program and funds should be defined, preferably with clear market indicators for when the exit procedures should be called upon. Where liquidity is a barrier and a fund is envisaged, the design should consider how long the fund would operate and an exit strategy formulated once the liquidity situation improves. Realistic timetables for the removal of such barriers and development of markets should be carefully assessed and appropriate project terms, sequencing of projects and use of programmatic approaches developed.[7]
4. *Incorporate good practice principles in detailed project design*, which include:
    - Commercial Orientation. The program should be based on commercial principles, investment-driven and avoid unduly distorting the market (e.g., lending to one sector, supporting only certain transaction/ESCO models). The program structure should carefully consider cost-recovery, leveraging commercial financing and maximizing private sector participation and local competition. Appropriate fees for GEF products and risks should be adopted to ensure market incentives guide decision making. TA is most effective when focused on transactions and targeted to creditworthy end-users. Governmental and Bank bureaucratic requirements (i.e., procurement, disbursements, reporting) should be minimized, to the extent possible.
    - Program Flexibility. The program structure should be designed to allow for different business models and financing (i.e., ESCOs, direct lending to end-users, off-balance sheet financing, leasing) and for procedures to be adjusted based on changing market conditions, demands and early implementation experience. Programs should also have built-in mechanisms for market actors to provide feedback to program implementing agencies on options to improve and further streamline administration.
    - Sharing of Risks and Incentives. Risks should be shared among all program participants (e.g., guarantors, lenders, ESCOs, equipment suppliers, end-users) to avoid moral hazard and allocated based on comparative advantages (i.e., technical risks to ESCOs, credit risks to banks, equipment performance risks to suppliers, operating risks to end-users). Proper incentives must be provided to all stakeholders to promote high volumes of successful projects. Fund managers should be properly incentivized to be proactive in identifying new business and helping applicants improve the quality of their proposals.

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[6] Use of facilitated stakeholder consultations, with representation from each of the various market actors, to discuss EE transactions and rank barriers and options to address them, has been identified as one tool for conducting such analyses.

[7] Experience with the development of EE and ESCO markets has already led to more programmatic efforts (in China, Brazil, Hungary and Vietnam) and longer project implementation periods (from typical 4-5 years to 6-7 years).

- Transparency. Program criteria, appraisal methods, procedures, evaluation procedures, access to training and TA, etc. must be provided in an open and transparent manner.

5. *Build the project pipeline early and intensively*. Programs should begin seeking potential transactions early in the project preparation cycle and be designed to allow a wide range of channels for projects to be identified and developed. Early transactions will allow the program procedures to be tested early on, provide the implementing agencies with immediate hands-on experience, and build early successful case studies and credibility for the program. This is particularly important given the historic mixed disbursement performance of many of the EE funds and credit lines in the past. Channels that have been used or considered in Bank/GEF projects have included fund managers, partner commercial banks, ESCOs, ESCO associations, industry/banks associations, government programs, utility DSM programs, etc. Where possible, some incentive mechanisms, such as sharing of project origination fees, could help improve cooperation with other agencies and programs. Of course, such pipeline building efforts must consider realistic timing of the program's effectiveness and the availability of funds; having full project proposals too early could harm ESCO business cycles and damage the program's credibility.

6. *Encourage competition for selection of program guarantor/fund manager*. Program success and sustainability can be greatly facilitated by selecting the best financial partners. Some Bank projects have selected fund managers based on both cost and quality criteria after the project was fully designed, which is recommended. Most, however, either selected the FI on a sole-source basis or based solely on their qualifications early in the project cycle (i.e., before the project was fully designed). There was obvious advantages to the latter approach, since the selected FI could help advise on some of the program details, draft project and operation manuals, begin recruiting partner banks and ESCOs/project developers, make use of existing internal business practices (e.g., appraisal methods, credit ratings), etc. However, this often placed the Bank and its clients at a disadvantage in negotiating the contractual terms, since the FI was already selected. In addition, such a process may lead to the FI advising on its own rules and project procedures which may not always be appropriate. In terms of the contract itself, efforts need to be made to balance incentives for deal flow and appropriate risk taking (for incrementally high perceived risks) while maintaining a need for GEF fund preservation and minimized market distortions. Remuneration clauses should consider the need to match payment options with FI needs, such as fixed payments for their fixed costs (staff, overhead, training, other start-up costs), output-based payments for their other services (e.g., program marketing, manual preparation, workshop delivery, reporting) and performance-based payments for their application reviews, deal flow and defaults.

7. *Continually monitor and market the program*. In the early years, it is expected that a number of implementation issues will arise that need to be addressed quickly and properly. Initial proposals will test the robustness of the program procedures and the administrator's capacity to follow them. Intensive efforts must be made to monitor and facilitate these initial transactions, adjust procedures as required and use early successes to further market the program. (Of the projects under implementation, most have taken about a year to close their initial deals.) Program credibility will be largely based on its ability to generate successful projects; thus, successes should be widely disseminated.

V. Conclusions

The GEF EE portfolio within the Bank has evolved considerably over the past 12 years and, in general, can be considered quite successful. It has leveraged substantial policy changes to support EE, developed and transformed markets, created a greater supply of EE products and services, leveraged some $2.5 billion and increased local capacity to operate such programs in over 30 countries. The portfolio has also provided useful insights on how to better prepare commercial EE programs, from effective business models to appropriate financing instruments. Despite these attributes, the Bank does need to improve its track record on the implementation side, particularly with respect to disbursements and high volume transactions. Project preparation times for GEF EE projects, which have been higher than conventional Bank energy projects, need to be reduced. Other areas, such as improved project planning, better prioritization of market barriers and strategies to overcome them, and more realistic implementation and procurement schedules will all help further strengthen the Bank's GEF EE program in the years ahead. While each program model has had some successes, no single model has emerged as a clear favorite. Thus, continued adaptation and innovation will be necessary in the future. As the portfolio further develops, new program modalities will emerge and require continued review and refining by the Bank.

Unfortunately, the Bank lacks a long-term strategy to develop such operations and, as a result, there is considerable variation in regional uptake of and commitment to GEF operations. In general, GEF programs have been stronger in regions where prospects for investment lending have been limited. One strong trend for GEF EE programs, which is now appearing globally, is the greater emphasis on developing financial sector interventions and instruments to support EE investment programs. This does not imply that other modalities of EE programs have been deemed unsuccessful, but rather that a consensus is emerging that achieving a significant impact in EE markets requires an explicit strategy to overcome a lack of appropriate and affordable financing. The recent expansion of GEF's strategy to utilize GEF funds in a contingent manner have also led to more innovative financial instruments and 18 operations across the Bank and IFC have now used or propose using GEF contingent financing.

In some ways, EE projects at the Bank are at a cross-roads: the more innovative uses of GEF funds in a contingent finance manner have reduced the need for Bank co-financing. However, the recent renewal of infrastructure programs and focus on Bank lending may serve to divert attention away from stand-alone GEF EE projects. In addition, recent years have seen a decline in EE thematic group work and dedicated EE specialists (e.g., ASTAE). This loss of institutional experience could reasonably result in both a decline in new project development and project design innovation. Some project models with very little demonstrated success, such as the use of guarantees, are already being extensively replicated. While the replication effects of these early projects could be a good sign, the portfolio could become overextended in certain areas with insufficient time for lessons to be incorporated into later projects. There is a fair risk that some projects may seek to copy previous operational designs rather than adapt and refine them, which could undermine the Bank's program in the years ahead. IFC, on the other hand, has noted that expanded opportunities for GEF non-grant contingent financing modalities in the EE sector has led to increased opportunities for IFC co-investment and even greater leverage of IFC and private sector investment. Management commitment and dedicated staff within IFC have reflected this.

Rationale for Energy Efficiency

While the EE portfolio is relatively strong in terms of the geographic diversity and size, there remains substantial opportunities for greater support for EE programs throughout the Bank's

client countries. Recent changes in institutional goals and strategic priorities necessitates that such programs continually justify how they meet current objectives. The recent Infrastructure Action Plan notes the need for a greater focus on service delivery, development of new, innovative financing instruments and better leverage of local financing – all of which EE programs support. The promotion of EE is consistent with the Bank's Fuel for Thought paper, which emphasizes the need for a more environmentally-sound approach to the development of energy sectors in these countries and is consistent with the Bank's priority of environmental protection and efficient use of country resources (both natural and economic).

EE programs offer potential solutions to address a number of critical issues facing Bank clients and provides outputs consistent with the Bank's overall mission, as illustrated in Table 4 (next page). The rational use of energy is important to assist clients to mitigate the adverse impacts of energy generation and its use on the environment. It also conserves natural resources, reduces countries' dependence on fossil fuels imports and fossil fuel-based generation, eases infrastructure bottlenecks, and improves industrial and commercial competitiveness through reductions in operating costs and increased productivity. With the huge projected investments needed in the energy sector in the developing world over the next few decades, EE considerations must form an essential component of the planning process.

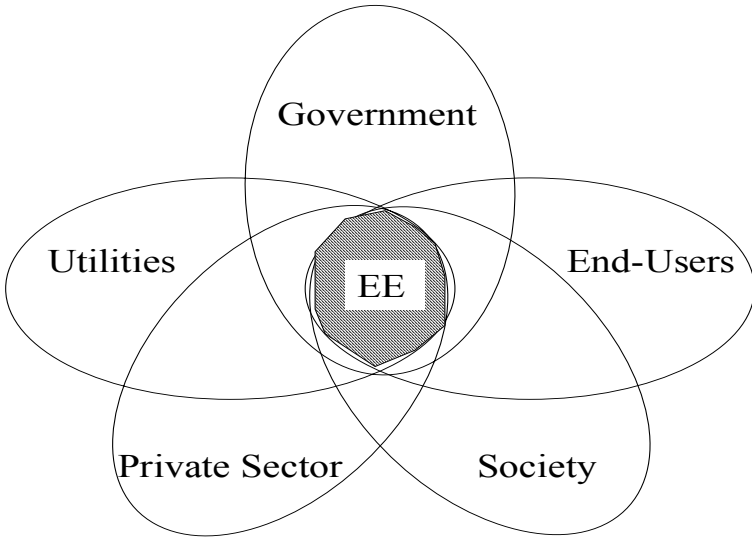

Figure 3: Energy Efficiency – A Convergence of Interests

EE programs can also offer cost-effective or low cost solutions to global environmental mitigation strategies and provide benefits to a number of stakeholders in client countries. The Bank should thus continue to work with these stakeholders to seek areas of convergence between these groups (see Figure 3, above). Governments and society benefit from a better allocation of financial/natural resources and environmental protection, utilities gain from better management of energy demand and improved service, end-users can reduce operating costs and increase productivity, and the private sector benefits from increased opportunities for potentially high return investments and demand for efficiency services, products and financing. The challenge is to identify suitable delivery mechanisms to achieve large-scale impacts for such investment opportunities, given that such benefits are often distributed among a wide variety of stakeholders.

Table 4. Energy Efficiency Program Objective Tree Analysis

Narrative Summary
***Bank Mission*:** 1. Ensure environmental protection 2. Foster public/private partnerships 3. Further sustainable reduction of poverty 4. Achieve institutional excellence ***GEF Operational Program*:** 1. Climate Change: Promote EE to reduce greenhouse gas emissions
***Bank Objectives*:** 1. Environmental protection 2a. Improved delivery of government services 2b. Private business development 2c. Private investment facilitation 3a. Improved social services 3b. Enhanced income among rural/urban poor 4a. Knowledge management 4b. Capacity building ***Global Objective*:** 1. Sustainable removal of commercial barriers to EE
***Outputs*:** 1a. Establish EE FI mechanisms and facilities 1b. ESCO development 1c. Improved EE in buildings 1d. Energy efficient equipment promotion 1e. Links to global/climate change programs 1f. TA 2aa. Utility load management/DSM 2ab. Municipal EE (water, government buildings) 2ba. ESCO development 2bb. Market development of EE equipment/services 2ca. Establish EE FI mechanisms and facilities 2cb. Manufacturer partnerships to improve EE products 3a. EE in health/education sectors 3b. Rural EE (agricultural, rural sectors) 4a. Information dissemination 4ba. Information dissemination 4bb. TA

Lessons Learned from GEF EE Portfolio

While many of the lessons learned from the entire GEF EE portfolio are specific to the various models, a number of common lessons have emerged. Many simply reinforce practices for proper

and disciplined project design and preparation for Bank projects. A summary of these key lessons learned and findings from this review are summarized below:

- *Policy*: A number of policy considerations have been highlighted, including the need for a supportive policy framework for EE programs, the need for energy prices to reflect true costs and thus provide sufficient incentives for EE investments, removal of price distortions for equipment (e.g., import tariffs), consideration of legal/taxation issues for ESCOs and proper coordination with parallel EE programs to avoid potential overlaps and conflicts.
- *Institutional*: There is a need for strong institutional ownership of programs (rather than just a few champions) to help ensure success, adequate institutional arrangements and capabilities for implementation - including centralized planning and decentralized implementation and monitoring, the need for sound project and financial management capabilities within PIUs, properly aligned incentives for all program agencies to ensure a successful program outcome and implementation arrangements that can withstand ongoing and proposed reforms.
- *Market Analysis*: Projects should seek to undertake comprehensive, holistic assessments of the markets upfront, engaging all stakeholders and market actors, including financiers. Such assessments should then lead to an analysis and prioritization of key barriers to EE transactions and specific intervention strategies and instruments developed for each one, customized to the country and target markets. New products and business models should be introduced using market principles and ensure that program models adequately take into account expected reforms in energy, banking and other relevant sectors.
- *Program Design*: Lessons dealing with program design include allowing for some flexibility in program design, maintaining a critical look at program sustainability early in project preparation, establishing credibility of technologies through development and enforcement of minimum program equipment performance standards, adapting international models to account for local conditions, initiating marketing campaigns to generate public awareness and energy-efficient product uptake, demonstrating projects, business models and institutional arrangements to help given credibility to EE mechanisms, and creating evaluation plans upfront.
- *Implementation Planning*: Project implementation plans should be achievable, with clear milestones for procurement of key assignments, development of initial Terms of Reference and advertisements by project appraisal, and more realistic expectations for time required to develop new markets, transform existing ones, create project pipelines, etc.
- *Sustainability*: The program should address institutional and financial sustainability early on in the project development stages. Whether through public sector budgetary support, surcharges and taxes, or purely commercial terms, the program should be viable, including any necessary parallel TA activities. Institutional arrangements, whether from DSM units or newly created EE agencies, should develop plans to sustain themselves or wind down activities once their objectives have been fully met.

Coordination with Other GEF Implementing Agencies

Emerging financing programs also raise issues related to comparative advantages of GEF IAs. Before, it was generally accepted that the Bank would work on GEF projects complementary to their investment lending programs; UNDP would focus on TA GEF efforts; and IFC would continue to work with private sector partners. However, the introduction of GEF guarantee and related instruments creates a product that all claim to be within their mandate. While some competition among IAs only serves to improve the robustness of the portfolio from the GEF

perspective, this unclear delineation of roles has served to confuse some clients and raise turn concerns among the IAs.

IFC notes that the use of GEF funds in a non-grant modality greatly expands its opportunities and believes that it has a comparative advantage for such programs and notes four points in this regard: (i) IFC is able to co-invest alongside GEF funds, thereby scaling-up guarantee reserves and thus leverage to the GEF funds; (ii) IFC serves as the guarantor and, therefore, remains intimately involved in the transactions on a daily basis; (iii) IFC has better contacts with local commercial banks; and (iv) IFC is better able to pool financing resources for multi-country programs.

All IAs should be eligible for developing new and innovative approaches for using contingent financing modalities to meet GEF's strategic objectives. The Bank should continue to support EE programs as part of its overall energy sector strategies, link EE programs within broader public policy dialogue and initiatives and develop local competitive EE markets on a broad basis. IFC should continue to seek to work more within developed markets with sufficient private sector players and financing. It remains to be seen whether UNDP, which has traditionally not been involved in actual project financing issues, can demonstrate capabilities in these areas. There is also some initial prospects for improved collaboration between the IAs. As the Bank completes initial GEF EE financing operations in some countries and has developed fair market activity, IFC could be invited to co-invest along side retained GEF funds in order to further expand EE financing on more commercial terms. The Bank could more systematically identify quality local ESCOs to IFC for possible equity investments. Further options to develop models for Bank/IFC collaboration should be explored.

Questions for Discussion

A number of questions also need to be considered and further discussed as we move forward. Some key questions include:

- Do such EE programs fit within the new Infrastructure Action Plan and, if so, is there a continued need for Bank co-financing for them? If not, is the Bank committed to such non-lending programs?
- Given the tremendous projected investments in the energy sector in our client countries over the next 20-30 years, can EE programs be scaled-up and, if so, how?
- Has their been sufficient macroeconomic analyses of supply-side versus demand-side options to meet growing energy demands within client countries and dissemination of the results? Should such analyses be incorporated into the planning process in restructured electricity sector frameworks?
- Should the Bank have a more integrated EE strategy across regions and/or convergence of approaches and program models? If so, would a convergence reduce innovation?
- Has the existing Bank EE portfolio missed potentially significant opportunities in EE? Have options for EE in rural areas (including traditional fuels), non-electricity uses, public sector EE programs, cross-sectoral EE, and other issues been sufficiently explored?
- Has the existing Bank GEF EE program leveraged sufficient conducive EE/energy policies?
- Should project designs be overly concerned with creating one or only a few market players (e.g., banks or ESCOs) versus seeking to develop a more equitable and competitive market upfront?

- Is the GEF increasingly bearing risks that are not incremental to EE projects, such as corporate credit, macroeconomic, political, and other factors? Is an assessment needed later to determine the nature of loan defaults to see their relationship with the EE project?

Annex 1. Energy Efficiency Project Database

Name of Project	Country	Project ID	Board Date	Region	Total Project Cost ($m)	GEF Amount ($m)	Bank Co-financing ($m)	Other Co-financing ($m)	Free Standing?	Closing Date	Status	DO/IO Ratings	Project Preparation Time	Project Extension (years)	% of Project for EE
		Project Details									**Project Status**				
Closed															
Sichuan Gas Transmission and Distribution	China	3404	1/31/94	EAP	$ 122.70	$ 10.00	$ 53.00	$ 59.70	Partially blended	6/30/03	ICR due 12/31/03	S/S	2.0	2	100%
Demand-Side Management Demonstration	Jamaica	7400	3/31/94	LAC	$ 12.50	$ 3.80	$ -	$ 8.70	Free standing	12/31/99	ICR completed	S/S	2.0	1	100%
High Efficiency Lighting Pilot	Mexico	7492	3/8/94	LAC	$ 23.00	$ 10.00	$ -	$ 13.00	Free standing	12/31/97	ICR completed	S/S	2.5	1	100%
Greenhouse Gas Reduction	Russia	8799	12/19/95	ECA	$ 3.70	$ 3.20	$ -	$ 0.50	Fully blended	6/30/99	ICR completed	U/U	2.8	0	2.8%
Energy Services Delivery	Sri Lanka	39965	3/18/97	SAR	$ 1.90	$ 0.70	$ 1.00	$ 0.20	Fully blended	12/31/02	ICR completed	S/S	2.4	0	3.4%
Promotion of Electricity Energy Efficiency	Thailand	4647	4/7/93	EAP	$ 189.00	$ 9.50	$ -	$ 179.50	Partially blended	6/30/00	ICR completed	S/S	1.5	1.5	100%
Subtotal		6			$ 352.80	$ 37.20	$ 54.00	$ 261.60					2.2	0.9	
Ongoing															
Energy Efficiency	Brazil	47309	10/5/99	LAC	$ 125.50	$ 15.00	$ 43.40	$ 67.10	Fully blended	12/31/04	Project restructured 5/03; MTR 12/03	S/U	2.0	1	100%
Fuel-Efficient Industrial Boilers	China	35693	12/23/96	EAP	$ 101.38	$ 32.81	$ -	$ 68.57	Free standing	6/30/04	Project closes 6/04	S/S	2.8	3	100%
Energy Conservation	China	37859	3/26/98	EAP	$ 150.80	$ 22.00	$ 63.00	$ 65.80	Fully blended	6/30/06	MTR complete; project closes 6/06	S/S	1.8	0	100%
Beijing Second Environment	China	64924	6/20/00	EAP	$ 534.88	$ 25.00	$ 165.00	$ 344.88	Partially blended	12/31/06	MTR complete; project closes 12/06	S/S	1.9	0	42.6%
Second Energy Conservation	China	67337	10/24/02	EAP	$ 281.20	$ 26.00	$ -	$ 255.20	Free standing	6/30/10	MTR scheduled for 1/05	S/S	2.9	0	100%
Energy Efficiency	Croatia	71461	10/7/03	ECA	$ 39.80	$ 7.00	$ 5.00	$ 27.80	Fully blended	6/30/10	Effectiveness expected 2/04	S/S	2.7	0	100%
Power and Communications Sectors Modernization at	Ecuador	72527	11/20/01	LAC	$ 7.11	$ 1.23	$ 0.51	$ 5.37	Fully blended	6/30/06	MTR scheduled for 12/03	S/S	2.8	0	16%
Energy Efficiency (Second Renewable Energy)	India	55906	6/28/00	SAR	$ 37.00	$ 5.00	$ 20.00	$ 12.00	Fully blended	3/31/06	MTR completed 7/03	S/S	3.6	0	12%
Heat Demand Management (Vilnius DH)	Lithuania	73242	6/10/03	ECA	$ 40.10	$ 6.50	$ -	$ 33.60	Free standing	6/30/08	Effectiveness expected 12/03	S/S	2.5	0	100%
Energy Efficiency	Romania	68062	9/19/02	ECA	$ 34.00	$ 10.00	$ -	$ 24.00	Free standing	12/31/07	Effective 2/03; MTR scheduled 6/05	S/S	2.6	0	100%
Building Chiller Replacement	Thailand	69027	6/1/01	EAP	$ 4.98	$ 2.50	$ -	$ 2.48	Free standing	9/30/05	MTR scheduled for 12/04	S/S	2.3	0	100%
Demand-Side Management and Energy Efficiency	Vietnam	71019	6/24/03	EAP	$ 18.56	$ 5.50	$ 5.20	$ 7.86	Partially blended	6/30/07	Effective 11/03, MTR scheduled for 6/05	S/S	2.5	0	100%
Subtotal		12			$ 1,375.31	$ 158.54	$ 302.11	$ 914.66					2.5	0.3	
Under Preparation															
Energy Efficiency	Bulgaria	84831	Oct-04	ECA	$ 63.50	$ 10.00	$ -	$ 53.50	Free standing		Concept note approved 6/03				100%
Energy Sector Reform	Burkina Faso	73358	Jun-04	AFR	$ 5.00	$ 0.50	$ 3.50	$ 1.00	Fully blended		Brief approved 5/02				4%
Heat Reform and Building Energy Efficiency	China	72721	Nov-04	EAP	$ 500.00	$ 15.00	$ -	$ 485.00	Free standing		Brief expected 1/04				100%
Improving Agricultural Pumpsets	India	73913	May-05	SAR	$ 107.50	$ 25.00	$ -	$ 82.50	Partially blended		On hold pending sector reform issues				100%
Electric Cooperative System Loss Reduction	Philippines	66532	Jan-04	EAP	$ 62.50	$ 12.00	$ -	$ 50.50	Free standing	12/31/11	Appraisal completed, negotiations 1/04		2.58		100%
Energy Efficiency	Poland	70246	Apr-04	ECA	$ 64.42	$ 11.00	$ -	$ 53.42	Partially blended	6/30/09	Appraisal 11/03		4.42		100%
Energy Efficiency	Serbia & Mor	85099	Aug-04	ECA	$ 25.73	$ 6.00	$ 11.00	$ 8.73	Partially blended		Brief expected 5/04				100%
Energy Service Company Development	Thailand	65972	May-05	EAP	$ 215.00	$ 15.00	$ -	$ 200.00	Free standing		On hold; may be dropped				100%
Energy Efficiency for the Industrial Sector	Tunisia	78131	Jun-04	MNA	$ 31.80	$ 8.50	$ -	$ 23.30	Free standing		Brief submitted 10/03, Appraisal 2/04				100%
Energy Efficiency	Uruguay	68124	Mar-04	LAC	$ 20.90	$ 6.88	$ -	$ 14.03	Partially blended	6/30/08	Appraisal 12/03		3.5		100%
Subtotal		10			$ 1,096.35	$ 109.88	$ 14.50	$ 971.98					3.5		
Proposed															
Energy Efficiency in the Industrial Sector	Algeria		FY06	MNA	$ 42.00	$ 10.00	$ -	$ 32.00			Concept note not yet written				100%
Energy Conservation Policy Implementation	India	75357	FY05	SAR	$ 49.00	$ 9.00	$ -	$ 40.00	Free standing		Concept note under revision				100%
Second Southern Provinces Rural Electrification	Laos	80054	FY05	EAP	$ 2.25	$ 1.00	$ 1.00	$ 0.25	Fully blended		Concept note not approved				6%
Energy Efficiency	Macedonia		FY06	ECA					Stand alone		Concept note not yet written				100%
Second Rural Energy	Vietnam	80074	FY05	EAP	$ 8.20	$ 4.00	$ 3.00	$ 1.20	Fully blended		Concept note under revision				100%
Second Demand-Side Management & Energy Efficien	Vietnam		FY06	EAP							Concept note not yet written				100%
Subtotal		6			$ 101.45	$ 24.00	$ 4.00	$ 73.45							
TOTAL		**34**			**$2,925.91**	**$329.62**	**$374.61**	**$2,221.69**							
GEF Medium-Sized Projects															
Ongoing															
Energy Efficiency Service Market	Cote d Ivoire	61324	4/1/99	AFR	$ 0.96	$ 0.70	$ -	$ 0.27	Free standing	12/31/03	Under implementation			1	100%
Improved Household Stoves in Urban Centers	Mongolia	68108	2/6/01	EAP	$ 1.55	$ 0.75	$ -	$ 0.80	Free standing	3/31/05	Under implementation			0	100%
Passive Solar for Rural Health Clinics	China	70161	11/8/01	EAP	$ 1.56	$ 0.75	$ -	$ 0.81	Partially blended	12/31/04	Under implementation			1	100%
Energy & Environment Upgrading of Sidi Bernoussi In	Morocco	74686	7/2/03	MNA	$ 11.70	$ 0.75	$ -	$ 10.95	Free standing	6/30/06	Under implementation			0	100%
Total		4			$ 15.77	$ 2.95	$ -	$ 12.82						1	

Name of Project	Country	Project Elements											Target Sectors								Project Benefits				
		Utility DSM	Utility ESCO	EE Audits	EE Products	Standards/Codes	ESCO Dev.	EE Policy	Marketing/Info	EE Financing	Supply-Side	Other	Contingent Financing?	Power	Oil & Gas	Dist. Heating	Industry	Buildings	Public	Residential	Banking	Estimated Carbon Savings (million tons CO2)	Actual Energy Savings (GWh/yr)	Actual Carbon Savings (million tons CO2)	Leverage Ratio	GEF $/ton CO2
Closed																										
Sichuan Gas Transmission and Distribution	China										✓	✓	n		✓							40.6			12.27	
Demand-Side Management Demonstration	Jamaica	✓		✓	✓				✓			✓	n	✓			✓	✓		✓		0.1	13	0.014	3.29	$ 271.43
High Efficiency Lighting Pilot	Mexico	✓			✓				✓				n	✓						✓		0.7	114.3	0.74	2.30	$ 13.51
Greenhouse Gas Reduction	Russia										✓	✓	n		✓	✓						12.8		2.9	1.16	$ 1.10
Energy Services Delivery	Sri Lanka	✓		✓		✓							n	✓						✓		0	0	0	2.71	
Promotion of Electricity Energy Efficiency	Thailand	✓		✓	✓		✓		✓				n	✓			✓	✓		✓		1.2	3,140	2.32	19.89	$ 4.09
Subtotal		4	0	3	3	1	1	0	3	0	2	3	0	4	2	1	2	2	0	4	0	55.4	3,267	6.0	6.9	$ 72.54
Ongoing																										
Energy Efficiency	Brazil	✓			✓	✓	✓	✓	✓				n	✓			✓	✓	✓	✓		21.0			8.37	$ 0.71
Fuel-Efficient Industrial Boilers	China				✓				✓				n				✓					181			3.09	$ 0.18
Energy Conservation	China						✓		✓				n				✓	✓				33.7			6.85	$ 0.65
Beijing Second Environment	China				✓				✓	✓		✓	n		✓	✓	✓	✓				98.6			21.40	$ 0.25
Second Energy Conservation	China						✓		✓	✓			y				✓	✓			✓	23.5			10.82	$ 1.11
Energy Efficiency	Croatia		✓	✓			✓			✓			y			✓		✓	✓	✓	✓	1.0			5.69	$ 7.29
Power and Communications Sectors Modernization at	Ecuador					✓	✓	✓	✓				n	✓			✓	✓	✓	✓		2.2			5.78	$ 0.57
Energy Efficiency (Second Renewable Energy)	India						✓			✓			n	✓			✓	✓		✓		2.8			7.40	$ 1.80
Heat Demand Management (Vilnius DH)	Lithuania	✓								✓			n			✓		✓		✓		1.5			6.17	$ 4.26
Energy Efficiency	Romania			✓			✓			✓			y				✓				✓	6.2			3.40	$ 1.60
Building Chiller Replacement	Thailand				✓					✓			y					✓				0.1			1.99	$ 24.30
Demand-Side Management and Energy Efficiency	Vietnam	✓			✓		✓		✓				n	✓				✓		✓		1.0			3.37	$ 5.75
Subtotal		3	1	2	5	2	8	2	7	7	0	1	4	4	1	3	8	10	3	6	3	372.6			7.03	$ 4.04
Under Preparation																										
Energy Efficiency	Bulgaria						✓			✓			y			✓	✓	✓	✓		✓	8.0			6.35	$ 1.25
Energy Sector Reform	Burkina Faso	✓							✓				n	✓					✓			0.0			10.00	
Heat Reform and Building Energy Efficiency	China							✓	✓		✓		n			✓		✓							33.33	
Improving Agricultural Pumpsets	India	✓			✓			✓	✓	✓	✓		n	✓						✓					4.30	
Electric Cooperative System Loss Reduction	Philippines									✓	✓		y	✓							✓	0.80			5.21	$ 15.00
Energy Efficiency	Poland		✓							✓			y			✓		✓	✓		✓	1.4			5.86	$ 7.86
Energy Efficiency	Serbia & Montenegro							✓		✓			y			✓				✓	✓	3.0			4.29	$ 2.00
Energy Service Company Development	Thailand			✓			✓		✓	✓			y				✓	✓			✓				14.33	
Energy Efficiency for the Industrial Sector	Tunisia			✓			✓		✓	✓			y				✓				✓	3.18			3.74	$ 2.67
Energy Efficiency	Uruguay	✓	✓	✓		✓	✓	✓	✓	✓			y	✓			✓	✓	✓	✓		1.29			3.04	$ 5.33
Subtotal		3	2	3	1	1	4	4	6	8	3	0	7	4	0	4	4	5	4	3	6	17.7			9.05	$ 5.68
Proposed																										
Energy Efficiency in the Industrial Sector	Algeria			✓			✓		✓	✓			y				✓				✓					
Energy Conservation Policy Implementation	India			✓			✓	✓	✓			✓	n	✓			✓	✓							5.44	
Second Southern Provinces Rural Electrification	Laos	✓		✓		✓	✓	✓					n	✓				✓		✓					2.25	
Energy Efficiency	Macedonia									✓						✓		✓		✓	✓					
Second Rural Energy	Vietnam							✓			✓		n	✓											2.05	
Second Demand-Side Management & Energy Efficien	Vietnam	✓		✓			✓		✓	✓				✓			✓	✓		✓	✓					
Subtotal		2	0	4	0	1	4	3	3	3	1	1	1	4	0	1	3	4	0	3	3				3.25	
TOTAL																										
GEF Medium-Sized Projects																										
Ongoing																										
Energy Efficiency Service Market	Cote d Ivoire						✓		✓	✓			n				✓	✓				0.4			1.38	$ 1.74
Improved Household Stoves in Urban Centers	Mongolia				✓	✓			✓				n							✓		0.1			2.06	$ 5.36
Passive Solar for Rural Health Clinics	China											✓	n					✓				0.8			2.08	$ 0.94
Energy & Environment Upgrading of Sidi Bernoussi In	Morocco			✓			✓		✓				n				✓					0.5			15.60	$ 1.50
Total		0	0	1	1	1	2	0	3	1	0	1	0	0	0	0	2	2	0	1	0	1.84			5.28	$ 2.38

IFC GEF Projects

Name of Project	Project Details														
	Country	Project ID	Approval Date	Region	Total Project Cost ($m)	GEF Amount ($m)	Bank Co-financing ($m)	Other Co-financing? ($m)	Free Standing?	Closing Date	Status	DO/IO Ratings	Project Preparation Time	Project Extension (years)	% of Project for EE
Closed															
Efficient Lighting (PELP)	Poland	502217	6/9/95	ECA	$ 5.00	$ 5.00	$ -	$ -	Partially blended	Jun-98	Closed and evaluated		1.5	0	100%
Energy Efficiency Co-Financing Fund (HEECP)	Hungary	502220	3/3/97	ECA	$ 25.00	$ 5.00	$ -	$ 20.00	Partially blended	Dec-01	Closed, funds reinvested in HEECP 2	HS/HS		0	100%
Efficient Street Lighting (MSP)	Argentina	502226	10/27/98	LAC	$ 0.74	$ 0.74	$ -	$ -	Partially blended		Closed and evaluated				100%
Ongoing															
Commercializing Energy Efficiency Finance (CEEF)	Global	506396	10/31/02	ECA	$ 70.85	$ 18.00	$ 50.00	$ 2.85	Partially blended	Dec-10	Under implementation		0.6		100%
Efficient Lighting Initiative (ELI) - Tranche 1	Global	502238	6/24/99	GLO	$ 44.58	$ 9.58	$ 4.00	$ 31.00	Partially blended	Dec-03	Under implementation	S/HS	1.3	1	100%
Efficient Lighting Initiative (ELI) - Tranche 2	Global	502238	3/21/00	GLO	$ 38.65	$ 5.65	$ 3.50	$ 29.50	Partially blended	Dec-03	Under implementation	S/HS	1.8	1	100%
Renewable Energy and Energy Efficiency Fund (REEF	Global	502222	12/3/97	GLO	$ 120.00	$ 15.00	$ 17.50	$ 87.50	Partially blended	Dec-07	Fund closed 10/02, project to be restructu	US/HU	2.5	0	50%
Energy Efficiency Co-Financing Fund 2 (MSP)	Hungary	505970	10/22/01	ECA	$ 93.90	$ 0.70	$ 12.40	$ 80.80	Partially blended	Dec-09	Under implementation	HS/HS			100%
Under Preparation/Proposed															
Energy Efficiency Credit Facility	TBD	507694	FY05	TBD	$ 77.60	$ 8.00	$ 19.00	$ 50.60	Free standing		Concept note approved, Brief 10/04				100%
Energy Efficiency (FEER)	Russia	521184	Jun-04	ECA	$ 53.50	$ 6.00	$ 14.50	$ 33.00	Partially blended		Concept note approved, Brief 5/04				100%
LED Lighting	India		FY06	SAR					Free standing		Concept note to be submitted 5/04				100%
Total		11			$ 529.82	$ 73.67	$120.90	$ 335.25					1.5	0.4	

IFC GEF Projects

Name of Project	Country	Project Design/Model												Project Design/Model								Project Benefits				
		Utility DSM	Utility ESCO	EE Audits	EE Products	Standards/Codes	ESCO Dev.	EE Policy	Marketing/Info	EE Financing	Supply-Side	Other	Contingent Financing?	Power	Oil & Gas	Dist. Heating	Industry	Buildings	Public	Residential	Banking	Estimated Carbon Savings (million tons CO2)	Actual Energy Savings (GWh/yr)	Actual Carbon Savings (million tons CO2)	Leverage Ratio	GEF $/ton CO2
Closed																										
Efficient Lighting (PELP)	Poland	✓			✓	✓			✓				n	✓						✓		0.2	2,320	2.75	1.00	$ 1.82
Energy Efficiency Co-Financing Fund (HEECP)	Hungary						✓			✓			y			✓		✓	✓	✓	✓	2.8			5.00	$ 1.82
Efficient Street Lighting (MSP)	Argentina	✓			✓				✓	✓			n	✓					✓		✓	0.4			1.00	$ 2.01
Ongoing																										
Commercializing Energy Efficiency Finance (CEEF)	Global						✓			✓			y			✓		✓	✓	✓	✓	7.4			3.94	$ 2.43
Efficient Lighting Initiative (ELI) - Tranche 1	Global	✓			✓	✓			✓	✓			n	✓						✓		4.6			4.66	$ 2.09
Efficient Lighting Initiative (ELI) - Tranche 2	Global	✓			✓	✓			✓	✓			n	✓						✓		4.7			6.84	$ 1.20
Renewable Energy and Energy Efficiency Fund (REEF	Global									✓			y	✓	✓	✓	✓	✓							8.00	
Energy Efficiency Co-Financing Fund 2 (MSP)	Hungary						✓			✓			y			✓		✓	✓	✓	✓	2.6			134.14	$ 0.27
Under Preparation/Proposed																										
Energy Efficiency Credit Facility	TBD						✓			✓			y	✓			✓	✓	✓	✓	✓	6.5			9.70	$ 1.23
Energy Efficiency (FEER)	Russia						✓		✓	✓			y	✓		✓	✓	✓	✓		✓				8.92	
LED Lighting	India				✓															✓						
Total		4	0	0	5	3	5	0	5	9	0	0	6	7	1	5	3	6	6	8	6	29.1			18.32	$ 1.61

Annex 2: Additional Resources

GEF Documents

1. Birner, S., Martinot, E. "The GEF Energy-Efficient Product Portfolio – Emerging Experiences and Lessons," GEF Monitoring and Evaluation Working Paper 9, World Bank Report No. 24712, July 2002.
2. Martinot, E, McDoom, O. "Promoting Energy Efficiency and Renewable Energy – GEF Climate Change Projects and Impacts," Global Environment Facility, June 2000.

DSM Papers

1. Singh, J., Mulholland, C. "DSM In Thailand: A Case Study," ESMAP Technical Paper No. 008/00, October 2000.
2. "Operating Utility DSM Programs in a Restructuring Electricity Sector - Summary," ESMAP Workshop Proceedings, October 2000.

ESCO Papers

1. "ESCO Practitioners Workshop – Summary," ESMAP Workshop Proceedings, April 1999.

EE Financing Papers

1. "Developing Financial Intermediation Mechanisms For Energy Efficiency Projects – Focus on Commercial Banking Windows for Energy Efficiency – Summary," ESMAP Workshop Proceedings, January 2002.
2. "Private Sector Participation in Market-Based Energy-Efficiency Financing Schemes: Lessons Learned from Romania and Internal Experiences," ESMAP Report, December 2003.

Other Bank EE Publications

1. "Reducing Energy Costs in Water Utilities Through Energy Efficiency," ESMAP Project Experiences in Brazil, China and Central Asia, June 2003.
2. "District Heating Practitioners' Workshop – Summary," ESMAP Workshop Proceedings, January 2000.
3. "Energy Efficiency Fund Practitioners Workshop," ESMAP Workshop Proceedings, April 2000.

Sample Project Documents for EE Financing Projects

1. China Second Energy Conservation Project — Project Appraisal Document (PAD)

2. Croatia Energy Efficiency Project — PAD

3. Romania Energy Efficiency Project — PAD

4. IFC's Hungary Energy Efficiency Co-financing Project (HEECP)
Project Document (Phase 1) Project Document (Phase 2)
Project Models

5. IFC's Commercial Energy Efficiency Financing Project (CEEF) — PAD