CHINA-US ENERGY EFFICIENCY ALLIANCE

DEMAND-SIDE MANAGEMENT (DSM) PROGRAM PROCEDURES MANUAL

DSM FINANCING ANNEX
Financing DSM and Energy Efficiency Programs

July 2009
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<td>Description</td>
<td>Acronym</td>
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<td>------------------------------------------------------------------------------</td>
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<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
<td>DSCR</td>
</tr>
<tr>
<td>ANME</td>
<td>National Agency for Energy Conservation</td>
<td>DSM</td>
</tr>
<tr>
<td>BEE</td>
<td>Bureau of Energy Efficiency</td>
<td>ECO-Asia CDCP</td>
</tr>
<tr>
<td>BELP</td>
<td>Bangalore Efficient Lighting Program</td>
<td>EE</td>
</tr>
<tr>
<td>BESCOM</td>
<td>Bangalore Electricity Supply Company</td>
<td>EERF</td>
</tr>
<tr>
<td>BOOT</td>
<td>Build-Own-Operate-Transfer</td>
<td>EMCs</td>
</tr>
<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
<td>EMCA</td>
</tr>
<tr>
<td>CEEF</td>
<td>Commercializing Energy Efficiency Finance</td>
<td>ENCON</td>
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<td>CFL</td>
<td>Compact Fluorescent Lamps</td>
<td>ESAa</td>
</tr>
<tr>
<td>CHP</td>
<td>Combined Heating and Power Systems</td>
<td>ESCOS</td>
</tr>
<tr>
<td>CHUEE</td>
<td>China Utility-Based Energy Efficiency Finance Program</td>
<td>ESFs</td>
</tr>
<tr>
<td>DEDE</td>
<td>Department of Alternative Energy Development and Efficiency</td>
<td>FIs</td>
</tr>
<tr>
<td>DFIs</td>
<td>Development Finance Institutions</td>
<td>FREE</td>
</tr>
<tr>
<td>DNA</td>
<td>Designated National Authorities</td>
<td>GDP</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
<td></td>
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<tr>
<td>---------</td>
<td>------------------------------------------------</td>
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</tr>
<tr>
<td>GEF</td>
<td>Global Environment Facility</td>
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<tr>
<td>GHG</td>
<td>Greenhouse Gas</td>
<td></td>
</tr>
<tr>
<td>GOK</td>
<td>Government of Kerala</td>
<td></td>
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<tr>
<td>HVAC</td>
<td>Heating, Ventilating, and Air Conditioning</td>
<td></td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
<td></td>
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<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
<td></td>
</tr>
<tr>
<td>JI</td>
<td>Joint implementation</td>
<td></td>
</tr>
<tr>
<td>KEMCO</td>
<td>Korea Energy Management Corporation</td>
<td></td>
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<tr>
<td>KSECF</td>
<td>Kerala State Energy Conservation Fund</td>
<td></td>
</tr>
<tr>
<td>kWh</td>
<td>Kilowatt Hour</td>
<td></td>
</tr>
<tr>
<td>MKE</td>
<td>Ministry of Knowledge Economy</td>
<td></td>
</tr>
<tr>
<td>M&amp;V</td>
<td>Measurement &amp; Verification</td>
<td></td>
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<tr>
<td>NDRC</td>
<td>National Development and Reform Commission</td>
<td></td>
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<tr>
<td>NGO</td>
<td>Non-Government Organization</td>
<td></td>
</tr>
<tr>
<td>NPV</td>
<td>Net Present Value</td>
<td></td>
</tr>
<tr>
<td>NRDC</td>
<td>Natural Resource Defense Council</td>
<td></td>
</tr>
<tr>
<td>PI</td>
<td>Project Implementer</td>
<td></td>
</tr>
<tr>
<td>PRC</td>
<td>Peoples Republic of China</td>
<td></td>
</tr>
<tr>
<td>RFP</td>
<td>Request for Proposal</td>
<td></td>
</tr>
<tr>
<td>SAFE</td>
<td>State Administration of Foreign Exchange</td>
<td></td>
</tr>
<tr>
<td>SMEs</td>
<td>Small and Medium Enterprises</td>
<td></td>
</tr>
<tr>
<td>SOEs</td>
<td>State-Owned Enterprises</td>
<td></td>
</tr>
<tr>
<td>SPP</td>
<td>Simple Payback Period</td>
<td></td>
</tr>
<tr>
<td>TA</td>
<td>Technical Assistance</td>
<td></td>
</tr>
<tr>
<td>TCE</td>
<td>Ton of Coal Equivalent</td>
<td></td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
<td></td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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ACKNOWLEDGMENTS

This report was prepared as a technical Annex to supplement the China DSM Implementation Manual, which was developed at the request of China’s National Development and Reform Commission (NDRC) in order to provide guidance to China’s efforts to scale up demand-side management (DSM) and energy-efficiency programs across the country. The Annex was prepared in cooperation with the Natural Resource Defense Council (NRDC), the China-US Energy Efficiency Alliance, and China’s State Grid Corporation, as part of the overall work on the DSM Implementation Manual.

Support for the Annex was provided by the US Agency for International Development’s Regional Development Mission for Asia, through USAID’s ECO-Asia Clean Development and Climate Program. The lead author of the Annex was Dilip Limaye, who prepared the Annex with support from John MacLean, whose inputs focused on commercial finance and energy service companies (ESCOs). The Annex was developed under the direction of Dr. Peter du Pont, Chief of Party of the USAID ECO-Asia Clean Development and Climate Program.
SECTION I

INTRODUCTION

1.1 OVERVIEW

China is making major strides towards increasing demand-side management (DSM) activities. Governments at the national, provincial and local levels, as well as industry, enterprises, and organizations are recognizing the importance and the significant social and economic benefits of DSM in China. To further encourage and facilitate DSM activities in China, the National Development and Reform Commission (NDRC) formally launched the development of a national DSM Implementation Manual to provide guidance to the nation’s DSM efforts. The Natural Resource Defense Council (NRDC) and the China-US Energy Efficiency Alliance assembled a team of top international and domestic experts to take on this important task. This document represents the DSM Financing Annex as a companion piece to the DSM Implementation Manual.

The DSM Implementation Manual and DSM Guide

The NDRC and the State Grid Corporation earlier produced a comprehensive Electricity Demand-Side Management Working Guide (“Guide”), published in 2007. The Guide discusses the basic concepts of DSM, reviews the history and evolution of DSM in China and other countries, introduces a series of laws and regulations relating to DSM, and discusses the methodologies of calculating avoid costs and DSM related cost-benefit analysis. The Guide also reviews issues related to DSM implementation and discusses a range of DSM technology applications for major industrial sectors in China. The DSM Implementation Manual (“Manual”) focuses the implementation procedures for DSM at the program and the project levels, providing a detailed description of how DSM can be implemented.

The Manual provides practical implementation guidelines that demonstrate how DSM can act as a resource comparable to traditional energy supply resources to address growing energy demands resulting from economic development. Because China’s industrial sector is the country’s largest consumer of electricity, the Manual primarily focuses on industrial retrofit efforts to help decision makers better understand how DSM can be implemented in the industrial sector.

The Need for a DSM Financing Annex

The Manual describes the institutional structure for industrial DSM program implementation and discusses the roles and responsibilities of the Program Administrator, the Program Manager and the Program Implementer as well as the possible role of energy service companies (ESCOs). The Manual presents a wide range of program design options such as rebate programs, direct install programs, DSM bidding programs, the standard offer approach, and energy audit programs. These program designs describe the actions taken by the Program Administrator to develop a portfolio of carefully planned DSM market interventions, which are defined as programs. These programs are focused activities that encourage energy consumers to implement energy efficiency projects in their facilities.

A Project Implementer is the entity that develops and manages an energy efficiency project in a customer facility. The implementer also interacts with the Program Manager to fulfill program requirements, report savings, and receive incentive money or services. An implementer can be a facility, an enterprise, a government agency, an ESCO, a specialty contractor, an engineering firm, or other
qualified entity designated by the Program Manager. The major implementer’s roles and responsibilities of the Project Implementer can be classified into 3 types that are common to all energy efficiency projects: planning, construction, and measurement and verification.

The construction phase of the most types of DSM programs generally requires the procurement, installation and management of energy-efficient technologies, equipments or products. The Program Implementer therefore needs to have the resources for the acquisition and implementation of such technologies, equipments and/or products. While most DSM program designs may provide some types of financial assistance to the project Implementer, they rarely provide all of the needed financial resources. A key element of the DSM implementation process is therefore the financing required by the Project Implementer.

This DSM Financing Annex addresses the various mechanisms for providing the financing for project implementation.

1.2 OBJECTIVES OF THE DSM FINANCING ANNEX

The principal objective of this DSM Financing Annex is to provide information and guidance to Program Administrators, Program Managers, and Project Implementers on the financing mechanisms for facilitating the implementation of energy efficiency projects. The Financing Annex:

• Identifies a range of financing approaches and mechanisms to assist Program Implementers in obtaining the financial resources needed for project implementation.
• Defines which financing mechanisms may be appropriate for each of the different program design options identified in the Manual.
• Describes international best practice and experience in China relative to the establishment of energy efficiency (EE) funds.
• Describes the potential roles of commercial financial institutions and energy service companies (ESCOs) in financing energy efficiency projects.
• Provides case studies of financing approaches used by multilateral donor agencies in China and examples of financing mechanisms successfully deployed in several other Asian countries.
• Summarizes relevant financing options for future implementation of EE and DSM projects in China.

1.3 INTENDED AUDIENCES

The DSM Financing Annex is written for the following audiences:

• senior policymakers and managers responsible for establishing public policies and programs for DSM;
• DSM program planners, who are responsible for developing specific program plans and procedures;
• DSM project implementers who are responsible for design, procurement and installation of the needed technologies, equipment and products to implement the energy efficiency projects;
• Commercial financial institutions who may provide financing for energy efficiency projects; and
• Energy service companies who may implement energy efficiency projects using a performance contracting approach.

1.4 SUMMARY OF APPROACH

The approach used for developing this Financing Annex included the following steps:

• identification of the need for financing as a key element in the project implementation process in China;
• review of financing mechanisms for energy efficiency projects in the U.S., China and other countries;
• assessment of how different financing mechanisms may apply to different program designs;
• identification of the potential role of commercial financial institutions and approaches to encourage these
institutions to participate in financing energy efficiency projects;

• review and assessment of the experience from multinational donor agency projects to encourage the participation of ESCOs in energy efficiency project implementation in China; and

• development and documentation of case studies of EE financing.

1.5 OUTLINE OF THE DSM FINANCING ANNEX

This Financing Annex is organized into the following Sections:

• Section 2 - Overview of Financing Mechanisms for Different Program Designs

• Section 3 - Direct Financing by Government Agencies - Creation Of Energy Efficiency Funds

• Section 4 - Leveraging Commercial Financing

• Section 5 - Financing Mechanisms with ESCO Implementation

• Section 6 - Other Financing Mechanisms

• Section 7 - Case Studies of DSM/EE Financing

• Section 8 - A “Road Map” for Designing DSM Financing Mechanisms

SECTION 2

OVERVIEW OF FINANCING MECHANISMS FOR DIFFERENT PROGRAM DESIGNS

2.1 THE NEED FOR FINANCING

In China, a range of DSM and EE programs are being initiated, developed and promoted by governments at all levels - National, Provincial and Local - sometimes in cooperation with energy utilities. The range of program types encompasses rebate programs, direct install programs, DSM bidding programs, the standard offer approach, and energy audit programs. The Program Administrators and Program managers design these program types to offer certain incentives and promotional mechanisms to facilitate actions by the Project Implementers related to project planning, equipment procurement, and installation of energy efficient equipment. It is important to note that while almost all the program designs provide certain types of financial incentives to project implementers, rarely do they provide the entire amount of funds required for the procurement and installation. The project implementer therefore needs to have access to financial resources.

While some Project Implementers may have adequate financial resources and may be willing to deploy these resources for implementation of energy efficiency projects, the worldwide experience with such projects indicates that internal funds have many competing demands and energy efficiency projects rarely get high priority for the allocation of internal funds. Therefore the Project Implementer needs to obtain financing from other funding sources.

2.2 BARRIERS TO FINANCING ENERGY EFFICIENCY PROJECTS

The following are the typical barriers encountered by Project Implementers in obtaining the financial resources for energy efficiency (EE) project implementation.

• **Limited availability of internal funds** - Internal funds (equity) are generally not readily available for procurement of the equipment or products needed for EE project implementation.

• **Small project size** - The relatively small size of EE projects (compared to, for example, energy generation projects for plant expansion projects) makes them less attractive for conventional bank financing.

• **Limited application of “project financing” for EE projects** - The concept of “project financing” has not yet been widely accepted for EE projects in China.

• **Lack of knowledge and awareness** - Conventional lenders (such as commercial financial institutions) do not have sufficient knowledge and understanding of EE technologies and their economic and financial characteristics.

• **Risk perceptions** - Financial institutions (FIs) may perceive EE projects as more risky than their other conventional lending.
• **Relatively high transaction costs** - The transaction costs for EE projects are relatively high.

• **High project development costs** - EE projects have a relatively high proportion of “soft costs,” which FIs are reluctant to finance.

• **Requirement for Collateral or Balance Sheet Financing** - Financial institutions usually require high levels of collateral or strong borrower balance sheets to provide financing. Many energy users and energy service companies (ESCOs) may not have collateral or strong balance sheets (or may not be willing to commit their available collateral for EE projects).

• **Monitoring and measurement of energy savings** - Adequate methods and tools are not readily available to demonstrate the achieved energy savings.

### 2.3 INNOVATIVE FINANCING OF ENERGY EFFICIENCY PROJECTS

To overcome the barriers to energy efficiency project financing, a number of innovative financing mechanisms have been designed and implemented. Examples include:

- Establishment of special purpose energy efficiency funds, created through a surcharge or levy on energy sales, allocation from government budgets, special taxes, donor agency funds or other sources such as fees from certification or labeling of appliances. Such funds may provide grants, loans or other types of financial assistance for project implementation. Further discussion of energy efficiency funds is provided in **Section 3** of this Annex.

- Increasing the availability of financing from commercial financial institutions by providing them incentives such as interest subsidies, or by reducing their risk through provision of credit or risk guarantees. Mechanisms for encouraging and enhancing the role of commercial FIs in EE project finance are discussed in **Section 4**.

- Encouraging the use of performance contracting for EE project implementation by energy service companies (ESCOs) under which the ESCO arranges project financing for the EE projects. ESCOs and performance contracting are discussed in **Section 5**.

- Other financing mechanisms such as carbon financing, lease financing, creation of a “super-ESCO,” and utility financing of EE projects through the billing mechanism. These mechanisms are reviewed in **Section 6**.

### Table 2-1. Program Design Types

<table>
<thead>
<tr>
<th>Program Design</th>
<th>Summary Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Design</td>
<td>Financial incentives offered to partially offset the purchase cost of high-efficiency equipment or products.</td>
</tr>
<tr>
<td>Standard Offer</td>
<td>Purchase of energy savings resulting from implementation of a list of pre-approved measures at a fixed payment for each saved unit of energy (such as kWh or Gigajoules).</td>
</tr>
<tr>
<td>DSM Bidding</td>
<td>Solicitation of private contractors to submit proposals to improve energy efficiency levels within a targeted group of customers, with payments to contractors upon successful delivery of energy savings.</td>
</tr>
<tr>
<td>Direct Install</td>
<td>Use of utility or contractors to directly install low-cost, quick pay-back energy efficiency measures in energy user facilities.</td>
</tr>
<tr>
<td>Energy Audits</td>
<td>Provision of technical experts and/or financing to assess energy efficiency opportunities at energy using facilities.</td>
</tr>
</tbody>
</table>
2.4 PROGRAM DESIGN AND FINANCING

The alternative program design types in the Manual are summarized in Table 2-1. Subsequent sections of this Annex provide further details of how the different financing mechanisms may be used.

Different financing mechanisms may be appropriate for these different program design types. Table 2-2 below illustrates the needs for financing and the possible financing mechanisms that may be employed for implementation by the Project Implementer (PI).

<table>
<thead>
<tr>
<th>Program Design</th>
<th>Financing Need</th>
<th>Potential Financing Mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebates</td>
<td>PI needs to finance the non-rebate portion of the equipment cost.</td>
<td>EE Fund, Commercial financing ESCOs</td>
</tr>
<tr>
<td>Standard Offer</td>
<td>PI needs to finance the installation of the standard measures and demonstrate the savings achieved.</td>
<td>Commercial financing</td>
</tr>
<tr>
<td>DSM Bidding</td>
<td>PI needs to finance the design and implementation of the EE project before payment is made.</td>
<td>Commercial financing</td>
</tr>
<tr>
<td>Direct Install</td>
<td>PI may have to pay for the contractor (or utility) implementing the measures.</td>
<td>EE Fund, Commercial financing</td>
</tr>
<tr>
<td>Energy Audits</td>
<td>PI needs to finance the implementation of the audit recommendations.</td>
<td>EE Fund, Commercial financing, ESCOs</td>
</tr>
</tbody>
</table>

Table 2-2. Financing Options for Different Program Design Types
3.1 WHY ENERGY EFFICIENCY FUNDS?

Section 2.2 above presented the various barriers encountered in financing energy efficiency (EE) projects. As discussed therein, while energy-using organizations have funded a number of EE projects using their own funds, the competing demands for internal funds limit to lower priority for EE projects and limit the amount of funding available. Equipment suppliers have sometimes provided financing for the equipment purchase but such financing is limited only to the specific equipment and is limited to a short term (generally up to one year). National and local governments as well as donor agencies have provided financing for many EE projects in developing countries to promote and enhance the knowledge, understanding and experience with EE projects, but such funding has usually been program-specific and therefore of limited duration. Similarly NGOs, Foundations and others have financed a limited number of pilot and demonstration projects.

There have also been many efforts to encourage energy service companies (ESCOs) to implement EE projects using the performance contracting approach and these ESCOs have been responsible for providing or arranging financing for the projects. Also, there have been many efforts to encourage commercial financial institutions to more actively participate in financing EE projects either directly or in collaboration with ESCOs. Despite substantial efforts devoted by governments and donor agencies to these approaches, the available financing for EE projects has generally been limited and there has been increasing recognition that more sustainable financing mechanisms need to be developed and implemented.

One approach that has received increasing acceptance throughout both the developed and the developing worlds is the establishment of special purpose funds dedicated to financing EE projects. Such funds are known as energy efficiency funds.

3.2 ENERGY EFFICIENCY FUNDS - INTERNATIONAL OVERVIEW

EE Funds in the U.S. and Other Countries

As a part of a parallel project to develop a state level energy efficiency fund in the State of Kerala in India, the ECO-Asia program conducted an assessment of international best practices in energy efficiency funds¹ to examine the approaches and methods used in many different countries for establishing such funds.

The major lessons from the international assessment were:

- In the United States (U.S.), while the Federal government has implemented a number of energy efficiency initiatives, much of the activity related to energy efficiency funds (EE Funds) has been undertaken

at the State level.

- EE funds have been very successfully used in a number of U.S. states.

- The different mechanisms used by states to establish EE Funds include:
  - Regulations establishing a tariff levy or cess on electricity consumption
  - Special taxes
  - General state tax revenues
  - State bonds
  - Petroleum taxes
  - Certification fees

- The most common, reliable and sustainable source of funding is a tariff levy established by the energy regulator and collected by the utility via the customer’s bills.

- The levels of funding vary across different funds. The more progressive funds have assessed a levy of 1 to 3% of electricity sales revenue to finance their EE Funds (see Table 3-1 below).

Other examples of similar EE Funds include funds established in a number of other countries, including:

- New South Wales, Australia – Sustainable Energy Fund
- New Zealand – Sustainable Management Fund
- Thailand Energy Conservation Fund (ENCON)
- Romania Energy Efficiency Fund (FREE)
- Czech Republic Energy Savings Fund
- IFC – Hungarian EE Co-Financing Program and the Commercializing Energy Efficiency Finance (CEEF) Program
- Brazil – Energy Efficiency Charge
- Sri Lanka – Energy Conservation Fund
- Korea – Korea Energy Management Fund

### 3.3 CHARACTERISTICS OF ENERGY EFFICIENCY FUNDS

#### Management and Operation

The responsibilities for the management and operation of the EE Funds may be assigned to the utilities that are collecting the funds through the tariff or in other cases may be assigned to other Fund Managers such as:

- Existing government agency
- Specially created statutory agency
- Public-Private Partnership
- Municipalities
- Third Parties:
  - Independent Entity (with a Board of Directors comprised of Stakeholders)
  - Financial institutions
- Non-Government Organizations (NGOs)

<table>
<thead>
<tr>
<th>State</th>
<th>EE Spending as % of Annual Utility Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vermont</td>
<td>3.0%</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>2.4%</td>
</tr>
<tr>
<td>Washington</td>
<td>2.0%</td>
</tr>
<tr>
<td>Rhode island</td>
<td>1.9%</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>1.8%</td>
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<tr>
<td>Oregon</td>
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<td>New Jersey</td>
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<td>Montana</td>
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<td>California</td>
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<td>New York</td>
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</table>

The selection of the organization for fund management and operation may be based on consideration of some or all of the following criteria:

- Compatibility with public policy goals
- Credibility with funders and customers
- Technical, financial and administrative capacity
- Management incentive structure
- Ability to realize economies of scale and scope
- Minimal start-up requirements
- Ability to work collaboratively across agencies
- Ability to engage with DSM/EE stakeholders

**Project Financing Mechanisms**

The project financing mechanisms utilized by the EE Funds to finance PIs for specific projects include the following:

- Grants
- Loans
- Subsidies
- Equity Funds
- Loan guarantees
- Credit guarantees
- Supplier credits

**Criteria for Selecting Projects**

The criteria used for selecting the projects for financing generally include:

- Technical feasibility
- Compliance with environmental standards
- Financial characteristics
- Acceptability of the level of risk
- Replicability
- Contribution to developing sustainable energy efficiency markets
- Documentation of project characteristics

### 3.4 ENERGY EFFICIENCY FUNDS IN CHINA

#### Peoples Republic of China Energy Efficiency Policies

The Peoples Republic of China (PRC) has established a target to reduce energy intensity of GDP by 20% during the current Five-Year Plan (2006-2010). Large industry has been a major priority focus due to its large share of energy consumption (approximately 70% of all power use). China has adopted a Medium and Long-term Energy Conservation Policy (2005) focusing on energy conservation in key heavy industries, such as steel, petrochemical, cement, pulp and paper; and specifically for firms in the largest 1008 enterprises.

In October 2007 a revised Energy Conservation Law was adopted which strengthens the system of energy savings targets and expresses the national target as targets for provinces, local governments, state-owned enterprises (SOEs), energy utilities, and other large industry. The local governments in turn will progressively engage and devolve targets to medium and smaller enterprises, large commercial, hospitals, and other energy consumers in their jurisdictions. Investment in energy conservation projects will be motivated by multiple means. Government officials will have their performance evaluated in part against achievement of energy savings targets, with a detailed system established for rating these results; financial and fiscal incentives will be used; new programs will be implemented by local governments to support energy users to develop projects; and, energy audits will be required in government and large industrial sectors.

In November, 2007, the State Council promulgated three administrative rules: Plan for Implementing the Statistics Index System on Unit GDP Energy Consumption; Implementation Plan for Monitoring Unit GDP Energy
Consumption; and Implementation Plan for Assessing Government’s Achievements in relation to Unit GDP Energy Consumption. These rules were drafted by NDRC, National Statistics Bureau, State Environment Protection Administration, and other related departments, and together with three other technical or assessment methods on pollutant control. All these rules and methods have a common goal of facilitating the realization of 20% energy intensity reduction nationwide. In December 2007 the State Council issued an Energy Policy Update. Amongst other provision, this document promotes EE investment with multi-channel financing, and encourages development of commercial bank financing programs along with further expansion of government Energy Savings Special Funds.

**Special Project Funds for Energy Efficiency**

China’s national government and many Provincial governments have established Energy Savings Project Special Funds to provide financial incentives to energy users to implement projects. For the national government, the fund source is the government’s budget. In August 2007 the NDRC and the Ministry of Finance created the energy savings projects fiscal incentives. The national program allots an annual amount of RMB 200/ton of coal equivalent (TCE) energy saving for enterprises located in eastern China and RMB 250/ton TCE to those in western China. Sixty percent of this amount is paid up-front once the project’s application is officially accepted, with the balance paid at project commissioning. This amount typically corresponds to 10-20% of the capital cost of the energy savings project.

The national government is also establishing a new fund for clean energy projects from the Government’s share of revenues earned from CDM projects. The NDRC has formulated the Guidelines for Auditing Energy Savings of Energy Conservation Projects in April 2008 to set up procedures and technical qualifications for energy savings auditors to verify these values for projects. Some Provincial governments have also established special Energy Savings Funds (ESFs); examples include Jiangsu, Hebei and Guangdong. Jiangsu province has an annual budget of approximately 100 million RMB for this purpose. Specified incentive fund amounts are given to approved energy users as a credit on their power bills. Hebei province government appropriates a certain portion of city surcharge to the electricity bills amounting to RMB 80 to 90 million as the DSM special fund.

These types of funds may be used for financing energy efficiency projects in a number of different ways:

- **Grants** - The funds may be used to partially offset the investment costs for EE projects, thereby improving the economic attractiveness of the project to the implementer.

- **Loans** - The funds can be used to provide debt financing for projects to project implementers, thereby avoiding the need for seeking financing from commercial banks or other sources.

- **Interest Buy-down** - The funds could be used to provide a subsidy to a commercial financial institutions, which would then result in a loan to the project implementer at a lower than market interest rate.

- **Performance Contracting** - The funds could be used to assist project implementers in developing the project specifications and competitive bidding documents for engaging energy management companies to implement projects using the performance contracting approach.

- **Credit or Risk Guarantees** - The funds could be used to provide partial credit guarantees (or partial risk guarantees) to commercial FIs to make it less risky for them to provide debt financing for EE projects, thereby increasing the amount of commercial financing available for EE projects.
4.1 THE ROLE OF COMMERCIAL FINANCIAL INSTITUTIONS

Experience with financing energy efficiency projects in developing countries, as documented in the recent World Bank study of Financing energy efficiency in Brazil, China and India,\(^2\) has demonstrated that while a wide range of financing sources may be available for financing energy efficiency projects, the key source of sizable and sustainable flow of financing for EE projects has to be the local commercial financial institutions. Some of the issues in mobilizing financing from FIs for EE projects are:

- EE project financing is generally viewed by FIs as a small “niche” business.
- Project financing is generally considered for capital projects involving capacity expansion or increased production and not for cost reduction projects such as EE.
- FI staffs do not have sufficient knowledge and experience with EE projects.
- Most EE projects are small relative to other types of projects financed by FIs.
- Financing EE projects may involve changing certain established operational procedures, which FIs are reluctant to do.

In China, there are additional barriers to commercial FI financing of EE projects. The commercial banking system is undergoing a transition from a state-owned to a market-based system, and FIs are still reluctant to make loans that may be perceived as risky or to consider innovative risk mitigation approaches\(^3\). The interest rates in the Chinese financial markets are controlled, and there appears to be little incentive to take risks. As a result, Chinese FIs have not actively embraced debt financing of EE projects.

In view of China’s increasing emphasis on implementing EE projects on a large scale, the government has recognized the need to promote and facilitate increased lending by FIs for EE projects. As China’s ESCO industry matures and takes on an increased role in financing and implementation of EE projects (see Section 5 for further discussion) there is an even greater need for the FIs to step up and participate in collaborating with the ESCOs to provide project financing. It is anticipated that recent initiatives by the World Bank to provide a dedicated line of credit for EE financing and by IFC and GEF to implement a risk guarantee program for EE project finance (see Section 7.2 for further information) will help enhance the interest and activity of FIs in EE project financing.

This section outlines some of the issues and options related to facilitating increased participation of Chinese FIs in EE project finance.

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\(^3\) Ibid.
4.2 DEVELOPING EE/DSM FINANCIAL PRODUCTS FOR COMMERCIAL FINANCIAL INSTITUTIONS

Components of a Financial Product

Lending for EE projects is likely to be a new line of business for many Chinese financial institutions (FIs). New loan products, including related business plans and marketing campaigns, need to be designed. They may have strong similarities with existing loan products, such as term loans for industrial plant and equipment. The design of a financial product starts with assessment and selection of the target market. The choice of the target market should be based on:

- Whether the EE project economics are strong and compelling to the energy user;
- How the FI’s lending interests and capacities match the market needs;
- What knowledge the FI has regarding the sector’s credit characteristics and how it can assemble adequate security for the contemplated transactions.

The financial product design must define: tenor, pricing, down payment, required security and underwriting guidelines, required documentation and origination procedures. The objective is to design a financial product that is attractive to the target borrowers, easy to use, with reasonable security terms, and where the loan terms, tenors and payments are matched with the target EE project savings benefit streams so that loans can be self-amortizing through savings. To arrive at a well designed financial product, banks will often do initial transactions first to gain experience, then roll out the product through its branch network, conducting trainings for branch loan officers in the process. As one product is launched, new products can be developed, addressing further market segments.

Industrial Energy Efficiency Market Segmentation

There are several segments to the industrial energy efficiency market. A rough breakdown could include the following categories: large state-owned enterprises (SOEs); municipal corporations and infrastructure, and small and medium enterprises (SMEs). The market can be segmented by industry, e.g., steel, cement, petrochemical, pulp & paper, etc. SMEs can be further broken down by size. Utility data can be used to segment the market also by power demand and consumption. The market can also be segmented by marketing approach and transaction size. For example, leasing companies may be expert in vendor finance programs and funding smaller transactions. Certain banks, for example, China Development Bank, has capacity and expertise in long-term project finance, so waste heat recovery projects may be a suitable match for their skills.

4.3 STRUCTURING SECURITY FOR EE LOANS

Special Features of EE Loans

EE equipment tends to have low collateral value, so the asset value of the equipment can not be relied upon for financing security. However, EE equipment is essential to energy user’s operations, which improves willingness to pay and saves money, which in turn improves the ability to pay.

- Low Collateral Value. EE equipment often has relatively low collateral asset value. For most EE project, equipment represents 60-65% total project cost; EE projects have high portions of engineering, development and installation costs. EE equipment is installed in the end-user’s facilities and is often difficult and uneconomic to remove and use elsewhere. For these reason, EE project lending is most frequently not based on the equipment asset value, but on the credit worthiness of the energy end-user.

- Positive Credit Features of EE Equipment: Essential Use and Energy Cost Savings. EE equipment has two important positive credit features. First, EE equipment is “essential use” equipment, e.g., commercial buildings can not operate without their lighting, controls, and air conditioning; industry can not operate without its...
motors or boiler for process energy. Some lenders may even put “electronic keys” on equipment, so that the equipment can be locked down and made unavailable for use if the borrower fails to make loan payments. Because of this characteristic, the end-user’s willingness to pay on EE loans is enhanced. Second, EE projects save money and these savings improve the end-user’s ability to pay. Energy cost savings should be incorporated into lenders’ analysis of free cash flow and ability of borrowers and end-users to meet debt service payments.

How to Structure Security on Loans to End-Users

The main techniques for securing EE equipment and project loans to end-users include the following.

• Preferred Drawing Rights and Special Escrow Accounts. A preferred drawing right agreement or provision is included in the loan documentation whereby the borrower agrees that the lender is paid automatically at a defined payment date each payment period (monthly, quarterly) and this amount is automatically withdrawn from the borrower’s primary bank account. Lenders can establish special escrow accounts where borrowers deposit cash flows from defined revenue sources. The lender would have first call on funds in the escrow account for debt service.

• Security Interest in Equipment and Project. Although EE equipment may have relatively low collateral value, lenders should still perfect a security interest in equipment to assure that the lender’s interests are protected in future events. If a borrower defaults, a security interest in equipment may also allow a lender to deny access to or use of equipment even if it is not repossessed. In default events, the facilities in which the EE equipment is installed may be foreclosed, vacated or sold, and if the building itself is viable, i.e., in a good location and well-constructed, then it is likely that the building will be re-occupied by another owner or tenant. This new owner or tenant will use and benefit from the efficiency improvements made by the prior, defaulting owner/tenant. Lenders with a perfected security interest or mortgagor waiver can require the new owner/tenant to assume the remaining payment obligation as a condition of use of the building and thereby recover the loss due to default, providing a second way out of a loan.

• Reserve Funds. A common project finance technique is to establish dedicated reserves for debt service, repair and replacement of equipment or other purposes. Similar reserves can apply in EE project financing, for example, debt service reserves can be combined with the escrow account method by way of requiring minimum balances in the escrow account, equal to, say, 2-3 months loan payments.

• Recourse to Equipment Vendor. Because equipment finance increases the vendor’s sales and profits, the equipment vendor has an interest in supporting the financing. This can be in the form of direct recourse, limited or partial recourse, or repurchase or remarketing of equipment in default and repossession events.

• Portfolio Approach to Credit Structure. When many small financings can be pooled together, credit analysis performed using a portfolio or statistical approach becomes possible. The large number of small transactions can become a virtue from a credit analysis point of view: no single default can cause the lender to fail to recover principal. The estimated reasonable worst case default rates can be planned for in the structure and pricing of the overall program, with added reserves coming from fees, vendor recourse or even concessional risk sharing programs. Portfolio approaches to credit enhancement have been used for financing single- and multi-family residential EE finance products, vendor finance programs targeting SMEs and other loan portfolios.

• Collections via Utility Bills or Property Taxes. Utilities can be important partners or originators
for EE equipment loan financing. If the utility can perform collections of finance payments via utility bills, the credit structure of the loans will be enhanced. The convenience, habit and regularity of utility bill payment by the customer make for more dependable collections. The customer’s utility bill payment history can also be readily checked as a quick and easy method of credit verification. If the utility is also able and willing to terminate utility service in event of customer default on the finance payment, this would add a major incentive to repay and improve collections. Utility participation in such a program also lends credibility, which enhances program marketing. Banks can partner with utilities for this purpose. Similarly, banks are beginning to cooperate with local governments to collect EE loan payments via the property tax collections mechanism.

- **Extra Collateral from the Borrower.** Many lenders require borrowers to pledge hard or liquid asset collateral equal to a multiple, e.g., 150%, of the loan amount as a condition of lending. In China, it is most common to get mortgages on real estate as security, but this can be a barrier for borrowers. EE finance will prosper where lenders can make credit decisions on the basis of free cash flow and ability to pay and also include a prudent portion, e.g., 70%, of estimated energy cost savings in these calculations. Many EE finance programs emphasize this point and aim to assist the partner financial institutions to create secure transactions while requiring less extra collateral from borrowers, and instead, underwrite the loans based on the project’s benefit stream and the borrower’s ability to pay.

- **Guarantees and Credit Enhancement Programs.** Development finance institutions or other government development agencies may offer credit guarantee programs to support EE financing. Guarantees can be an effective tool to support expanded EE lending. Several EE finance guarantee programs are operating in China by the DFIs. These are described in Section 4. Such guarantee programs provide risk sharing to the FI, making it more attractive to finance EE projects. They can be models for new guarantee programs supported by Program Sponsors.

**How to Structure Loans to ESCOs**

Lending to ESCOs entails additional challenges and puts a greater burden of structuring and due diligence on the financial institution. In addition to the credit of the energy user, the lender must also understand the ESCO credit and capacities, the economics of the project, the terms of the energy services agreement, and other risk actors, making the appraisal process more intensive.

- **Loan Security.** Main security for loans to ESCOs include the ESCO rights to payments and other commitments of the end-user in the energy services agreement, security interest in the project equipment, the commitments of the ESCO to construct the project on time and on budget, (which commitment may be backed by construction bonds), and the ESCO’s commitment to perform services during the operations period. These would all be assigned to the lender. Further, the lender should be given the right to cure any ESCO default on its commitments to the customer. In addition, the financing structure may include establishment of reserve funds, either capitalized or funded from project revenues, and full or limited recourse commitments or credit support of the ESCO.

- **Project financial analysis.** The amount of financing extended with respect to each project must also be based on meeting a pre-defined target debt service coverage ratio, i.e., ratio between anticipated revenues (calculated based on reasonably conservative engineering assumptions) and debt service. Depending on the risk analysis and potential for variation of revenues in the deal, typical target debt coverages range from a minimum 1.25 to 1.50. The ESCO and lender must perform financial analysis evaluating all project risks and demonstrating the stability and integrity of the revenue stream in a reasonable range of project performance scenarios.
• **Reserves.** Some level of reserve funds are a possible requirement, e.g. 6 months of debt service. Reserve funds provide a cushion, assuring that debt service payments can continue to be made even if the project experiences some problems and buying time to solve problems prior to declaring an event of default. Reserve funds can also be used to cover extraordinary equipment repair and replacement costs. Reserve funds can be capitalized or contributed from project revenues or both. Also, a lender may want a "sweep" provision, i.e., requiring that a portion project revenues above a target level (after payment of debt service, O&M costs and remittance of some level of profits back to the ESCO) be applied to early payment of debt.

• **Multi-Project Finance Facilities for ESCOs.** When financing one ESCO project, FIs should explore the possibility of financing a series of projects pursuant to a multi-project loan facility. To establish an ESCO project finance facility, a master loan agreement could be executed between the ESCO and the financier. The master loan agreement would commit the lender to provide a certain volume of financing according to defined terms and conditions. It would reflect the lender’s acceptance of standard end-user agreements (ESAs), set parameters for economics of projects that can be financed under the facility, define financing terms including rates, fees, financing amounts and security provisions, and lay out procedures and conditions precedent for closing transactions under the facility. Approval of financing for each specific project would typically be required but would be based on (a) due diligence demonstrating that the project meets the pre-defined criteria, and (b) credit approval of the end-user. Construction financing may also be provided, but typically with a portion of funding withheld until completion, commissioning and acceptance. With a master loan facility commitment, the ESCO can develop projects that meet these criteria with confidence that funding will be available when the criteria are met.

### 4.4 TECHNICAL ASSISTANCE PROGRAMS FOR FINANCIAL INSTITUTIONS

To encourage financial institutions to increase their activities related to EE project financing, it may be necessary to educate their staffs on engineering and technical aspects of EE projects and to convince them that EE financing may offer good business opportunities for them. To accomplish this, the Program Administrator or Program Manager can design and implement a technical assistance (TA) program for financial institutions. Such a TA program will require the engagement of one or more qualified consulting firms who will provide the needed TA.

A typical agenda of supporting technical assistance (TA) activities for financial institutions is described below. Strategies for recruiting, engaging and working with FIs are also summarized. Key components of TA include: market research, marketing support, transaction structuring support, development of new financial products, staff training and business planning, and establishing technical standards and engineering due diligence.

#### Market Research & Marketing Support

Market studies can assess demand for various EE equipment, products and financial products, understand equipment and project economics, identify active and qualified EE system vendors and project developers, identify and assess target markets and their credit characteristics, and assess perspectives and programs of other key government, NGO, donor and policy actors which affect the market environment. Such studies can demonstrate to the FI the market and potential demand for EE financing. TA programs can assist lenders to establish relationships with EE businesses, equipment vendors, contractors and project developers; these companies need financing to support their sales. Vendor finance programs and multi-project finance facilities can be structured between participating lenders and EE/ESCO businesses.
SECTION 4 LEVERAGING COMMERCIAL FINANCING

Transaction Support & Development of New Financial Products

EE finance may be new to prospective partner banks. TA is highly valued to structure initial transactions. A lender can proceed opportunistically to finance initial transactions which meet their credit criteria, at the same time define target markets and design financial products with strong replication potential.

Training & Business Planning

EE finance training for lenders can cover EE technologies and applications, EE project economics, structuring EE equipment and project loans, lending to ESCOs, special risk and credit features, case studies, marketing FI financial services, and other topics. Training can be offered initially for a lender's headquarters staff. Then, as financial products are defined and adopted, ready to roll out, then branch staff can be trained on how to promote those specific products. Some lenders can use tailored assistance to prepare business and marketing plans for their implementation of their EE finance programs. Development finance institutions (ADB, IFC, World Bank) have prepared and implemented EE finance training programs for lenders. Compilation of best practices is recommended.

Engineering Due Diligence

Lenders will set technical standards and due diligence procedures for EE projects they will finance. Lenders have a material interest to make sure the equipment and systems are technically sound, durable, well-designed and installed, and backed by strong warranties and organized accessible after-sale service. Borrower willingness to repay is strongest if the equipment works properly and can weaken significantly if the equipment breaks or fails to perform as expected. Participating EE vendors in a program can be selected on the basis of their ability to meet minimum standards and be required to follow the standards in practice. This will mitigate potential loan portfolio risks. A TA program can help establish the standards and support lenders with technical knowledge, vendor criteria and selection, train loan officers and lead staff and provide support for product development and necessary changes in internal processes. For EE project financings, a TA program can also provide engineering due diligence on equipment and systems, and independent engineering reviews to confirm technical viability and economics of given projects. This type of service is highly valued by lenders. Post-project implementation performance reviews can also be valuable as a means of monitoring their loan portfolios.

4.5 RECRUITING AND ENGAGING COMMERCIAL FINANCIAL INSTITUTIONS TO PARTICIPATE

The vast majority of EE project finance must come from private sector commercial financial institutions. The need exists to mobilize commercial financial institutions to offer properly structured, adapted EE financial products. In China, ample liquidity and financial resources exist in the commercial banking systems, but need to be mobilized for EE/DSM lending.

Recruiting Commercial Financial Institutions: the Agenda for Development Finance

In general, in normal credit market conditions, commercial financial institutions are in the business to make loans as profitable assets. Attracting commercial lenders to EE finance requires a substantial, steady, and creditworthy set of projects for their financial products that can be originated profitably, with manageable transactions costs. These, in turn, require marketing, project investment preparation, market aggregation and use of secure transaction structures and in some cases credit enhancement. From the point of view of commercial lenders: (i) borrower creditworthiness and transaction structure and security are primary considerations; (ii) technical assistance to educate banks on engineering and technical aspects and due diligence of EE projects is very useful and can in fact be instrumental; (iii) banks must be

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5 See, for example, Investment and Financial Flows to Address Climate Change, United Nations Framework Convention on Climate Change, 2007, which prominently highlights this same conclusion.
convinced there is a real business here, which can best be accomplished by bringing banks real and qualified transactions to consider funding and assisting banks with marketing to establish relationships with equipment vendors and ESCOs that need financing for their projects and sales; (iv) banks are often interested in cross-selling other services, so opportunities to do so as an EE finance program brings them new customers and deposits should be explored. Generally, FIs do not initiate projects and can not drive the market or be the market protagonist. But they can brought to the table to finance EE projects provided their underwriting criteria, required appraisal methods, technical information needs and market strategies can be addressed. These criteria define the goals of development finance and Program Sponsors seeking to recruit financial institutions to finance EE projects.

Development finance institutions, like World Bank, Asian Development Bank, China Development Bank, other Government agencies and Program Sponsors can play instrumental roles to mobilize resources and capacities of commercial lenders for EE financing. Where sufficient liquidity exists, credit enhancement and risk sharing products can be instrumental to mobilize funding from commercial lenders; where it does not, DFIs can provide credit facilities; in some cases, both may be needed. Further, DFIs and Program Sponsors can serve to organize the market by designing and implementing EE finance programs to generate demand for the financing facilities it arranges or supports with partner FIs; DFIs can arrange donor funding for technical assistance and capacity building programs; and DFIs can also work with country governments to formulate enabling policies.

Introducing and effecting innovation within an FI

Lenders also need to be understood as large corporate organizations, acting in a policy and regulatory environment. Getting lenders to truly adopt and promote EE financial products involves an organizational process of introducing innovation. This requires leadership at the Board level, plus active understanding and advocacy of senior management. Further, to get middle management to implement the program, senior management (such as the governing Board of the FI) must provide a clear mandate, especially when the innovation involves introduction of new credit risk management practices. New financial products are usually tested and originated initially at the headquarters level. Then, when the new product, including underwriting guidelines is defined, they can be rolled out through training at the branch level. Middle management needs to be recognized and rewarded for promoting the new product line. This support must come from the top of the organization and followed through with reporting and recognitions. Supporting government and central bank policies and regulations can be instrumental to mobilize and direct the resources of commercial lenders to this market.

Request for Proposal for Banks

One method to recruit banks for a program is to conduct a “Request for Proposal” (RFP) process. The Program Administrator would define the market, the lending needs for individual projects, the estimated demand for financing for the target market as a whole, and the structure of the delivery mechanism. This information is presented to banks in the RFP document, and proposals from prospective banks to establish EE finance facilities are solicited. Bank proposals would define: estimated loan terms, underwriting guidelines and security structure, marketing plan and TA needs. The Program Sponsor may also some forms of credit enhancement and other incentives, for example, training, technical assistance and subsidies for transaction costs, to participating banks. The aim is to recruit commercial lenders to EE finance by demonstrating a substantial, steady, and creditworthy flow of demand for their financial products that can be originated profitably.
5.1 OVERVIEW OF ESCOS AND PERFORMANCE CONTRACTING

An approach for financing and implementation of energy efficiency projects that is becoming increasingly popular in many countries is the use of performance contracting. This approach addresses some of the major barriers to the implementation of EE projects such as the lack of awareness and knowledge of EE opportunities, on the part of some energy users, lack of technical expertise and capacity for implementation, limited internal capital and inability to access external capital for implementation.

Performance contracting refers to energy efficiency implementation services offered by private sector organizations known as energy service companies or ESCOs that are characterized by the following key attributes:

- ESCOs offer a complete range of implementation services, including design, engineering, construction, commissioning, and maintenance of the energy efficiency measures, and monitoring and verification of the resulting energy and cost savings.
- ESCOs also provide or arrange financing (often 100%) and undertake “shared savings” or “guaranteed savings” contracts, such that the payments to the ESCO are less than the cost savings resulting from the project implementation.
- Under the performance contract, ESCOs offer specific performance guarantees for the entire project (as opposed to individual equipment guarantees offered by equipment manufacturers or suppliers) and generally guarantee a level of energy and/or cost savings.
- Payments to the ESCO are contingent upon demonstrated satisfaction of the performance guarantees.
- Most of the technical, financial, and maintenance risk is assumed by the ESCO thereby substantially reducing the risks to the energy user.

The potential benefits of the performance contracting approach offered to energy users (customers) by ESCOs include:

- Performance contracts will provide performance guarantees to assure the successful implementation of the energy efficiency measures.
- ESCOs will generally provide operation and maintenance services to assure that the installed equipment continues to perform at a high level of efficiency.
- A mutually agreed upon monitoring and verification scheme is established to allow for actual measurement, verification and demonstration of the energy and cost savings.
- The ESCO provides breadth and depth of capabilities as well as training to staff of the customer.

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• The ESCO facilitates access to external capital for project implementation.

5.2 ALTERNATIVE MODELS OF PERFORMANCE CONTRACTING

While there are many different variations in the specific approaches to performance contracting, these can generally be characterized into two basic models7 - “Shared Savings” and “Guaranteed Savings.” In both models, the ESCO provides the complete range of implementation services and generates energy and cost savings. The differences are in the manner in which the customer makes payments to the ESCO and the way the benefits of the savings are allocated between the ESCO and the customer:

In the Shared Savings model, the ESCO generally provides or arranges for most or all of the financing needed for the implementation of the project. The performance contract then specifies the sharing of the cost savings between the ESCO and the customer over a period of time. The performance contracts may typically be 3 to 7 years in duration and the sharing of the payments is structured such that the ESCO will recover its implementation costs and obtain the desired return on its investment within that period. The customer generally makes no investment in the project and gets a share of the savings during the contract period and 100% of the savings after the contract period. A Shared savings contract requires as part of the performance contract a pre-specified protocol for measurement and verification of the actual savings achieved.

In a Guaranteed Savings performance contract the ESCO guarantees certain performance parameters (such as efficiency, energy savings, cost savings and/or other performance parameters) in the performance contract, which specifies the methods to be used to measure the performance and verify that the guarantees have been met, and the payments to be made to the ESCO once the performance guarantees are satisfied. The Guaranteed Savings contract generally provides the ESCO a fixed payment or payment stream upon the satisfaction of the performance guarantee, but may also provide the ESCO an incentive payment if the actual performance exceeds the guaranteed level.

The term ESCO has been used to designate a wide range of different types of organizations that may offer the performance contracting mechanism for implementing EE projects. Such organizations may include design and engineering firms, construction management firms, equipment manufacturers and suppliers, or teams comprising of two or more of the above types of organizations. ESCOs need both equity for project development and risk sharing, and debt financing for project costs and working capital. Therefore, ESCOs need to develop working relationships with commercial financial institutions and work with them to arrange the needed financing or EE projects.

In China, The World Bank, the International Finance Corporation (IFC), and the Asian Development Bank (ADB) have devoted considerable efforts and funding to establishing and growing ESCOs (see Section 7.2 for further discussion of these efforts). In China, the ESCOs are also known as Energy Management Companies or EMCs.

The ESCO industry in China has experienced three phases of growth.8 The first phase consisted of assistance from The World Bank and GEF to establish three ESCOs to demonstrate the performance contracting approach. After the successful demonstration, the second phase involved a credit guarantee program to help establish new ESCOs and enable them to develop collaborative financing schemes with financial institutions. The third phase, currently underway, is likely to allow ESCOs to work with FIs without the need for a guarantee mechanism.

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7 Many reports on international ESCO activities have described these two basic models. See for example, MOTIVA, International Review of ESCO Activities, July 2005, and Bertoldi, P and Rezessy, S., Energy Service Companies in Europe Status report, European Commission, DG JRC 2005.

The following sections describe the various models for ESCO financing and implementation of EE projects.

5.3 FINANCING MODELS FOR ESCO IMPLEMENTATION

Four distinct models of ESCO financing and implementation are discussed below:

- Financing with ESCO as Borrower
- Financing with Energy User as Borrower
- Vendor Financing with ESCO implementation
- Utility Financing of ESCOs

Financing with ESCO as Borrower

In this model (see Figure 5-1 below) the end-user enters into an Energy Services Agreement (ESA) with the ESCO for the project financing and implementation. The performance contract will specify the energy user payment obligation based on project performance, savings, delivered energy or the value of capital and services provided. The loan is typically on the ESCO's balance sheet. The ESCO assumes the energy user credit risk and may need lender assistance to assess this.

The ESCO will generally need to fund a portion of the project with equity, typically 10-30%, since the financial institution is not likely to provide 100% financing for the project. The end-user may make a capital contribution of 0-10%. The balance of project financing will come from debt.

In lending to the ESCO, the bank must assess end-user credit risk, and also the ESCO's technical, managerial and financial capacities, and project economics, contracts and risks. Thus, lending to ESCOs involves much greater appraisal and analysis by the lending bank.

Financing with Energy User as Borrower

In this model of ESCO financing and implementation, the energy user borrows the funds from the financial institution (sometimes with the assistance of the ESCO). The typical structure is depicted in Figure 5-2 below:

The project is implemented with two separate agreements, one for turnkey project implementation services between the energy user and the ESCO (Energy Services Agreement), and the other for project financing (Financing Agreement) between energy user and the financial institution (FI).

The energy user credit risks are separated from project performance and project technical risks. The FI assumes the energy user credit risk, while technical and performance
risks are addressed in the Energy Services Agreement. The energy user is obligated to make fixed loan payments. The loan payment amount is set to amortize the loan regardless of the project performance. The loan is on the balance sheet of the energy user.

The energy user generally assumes responsibility for equipment maintenance, and repair. Provision for equipment operations and maintenance services, warranties and performance guarantees can be included in the Energy Services Agreement.

**Vendor Financing with ESCO implementation**

A vendor finance program is a programmatic relationship between a company (vendor) selling EE equipment and a financial institution, under which the FI will provide financing to the energy user for the energy user to purchase the vendor’s equipment. For the FI, the vendor finance program creates a flow of financing business, aggregating demand from many small projects. The vendor markets the FI’s financial services and performs certain finance origination functions so as to lower FI transaction costs. In some cases, the vendor can provide credit support, help the FI offer financing to more customers. For the vendor, such a program supported increased sales. The customer pays for the equipment over time, matching payments with energy cost savings benefits.

An illustration of the structure of such a program is provided in **Figure 5-3** below:

- The energy user enters into an Energy Services Agreement (ESA) with the ESCO (equipment vendor) for turnkey implementation of the project.
- The ESCO introduces the end-user to the financial institution with which it has a Vendor Finance Agreement according to pre-arranged terms.
- The FI makes the loan or lease directly to the end-user. Finance payments are fixed.
- The ESCO may provide operations services and extended warranties guaranteeing performance of the equipment.

Alternative structures can also be considered, for example: (i) Vendor borrows from FI and on-lends to Customer or otherwise has a long-term Energy Services Agreement with Customer; or; (ii) Vendor enters into loan or rental or installment purchase agreement with Customer, and then Vendor sells this payment stream to FI; this latter structure is called factoring or forfeiting. These alternative structures can be very effective for marketing by the vendor, as the vendor combines equipment sale with financing. These are depicted in **Figures 5-4 and 5-5** below.

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**Figure 5-3. Vendor Finance Program**

- **Energy User**
  - Energy Services Agreement
  - Turnkey EE Project Installation & Services
  - Project Purchase Price
  - Loan/Lease Finance Payments
  - Capital $
  - Vendor Finance Agreement

- **ESCO, Equipment Supplier or Contractor**
  - Project/Equipment Sales & Installation & Sub-Loan Agreement
  - Capital for project installation

- **Financial Institution**

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**Figure 5-4. Bank Loan to ESCO with matching Sub-Loan**

- **Energy User**
  - Project/Equipment Sales & Installation & Sub-Loan Agreement
  - Fixed Payment, matched to amortize capital investment, plus other payments for services, etc.

- **ESCO**
  - Loan Agreement: capital for project installation
  - Debt/Service payments by assignment of Sub-Loan payments

- **Financial Institution**
Utility Financing of ESCOs

ESCOs have been frequently used as delivery mechanism in utility DSM programs. Utilities can contract with ESCOs to deliver energy savings as shown below. Utilities can also qualify ESCOs and EE companies and then provide financing to customers, in the form of loans or rebates that pay a portion of the cost of the project.

Under the first form of utility program, the utility purchases energy savings. The major characteristics of such a program (see Figure 5-6 below) are:

- The electric utility establishes a value for saved electricity per kW and kWh.
- The utility defines contractual terms for purchase of delivered savings, and selects target industrial customer markets for implementing EE/DSM projects.
- The utility conducts a procurement process for ESCOs, and enters into the DSM contracts with selected ESCOs.
- The ESCO markets to the energy users and implements projects. ESCO gets two revenue streams: one from the utility and one from customer.
- ESCO raises financing from bank, which receives assignment of project revenues to make debt service payments.

This type of utility financing program will work best when the ESCO market is mature, a number of technically capable ESCOs are operating in the market, and these ESCOs are able to have access to short-term financing from commercial FIs.

The second type of utility program is a Direct Install program with utility financing. The major characteristics of such a program are:

- The utility provides project development services to target industrial customers.
• The utility organizes and qualifies a “Supplier Network” of ESCOs to deliver equipment and services.

• The utility assists energy users to make purchasing decisions; customers choose an ESCO to implement project.

• The utility provides financing to the customer for the project and collects loan repayments through the utility bills.

• Utility can suspend power service to customer if customer defaults on loan payment.

• Utility borrows from bank as needed to fund the projects and repays bank from customer payments.

The utility billing and collections mechanism can be used to collect finance payments from end-users. This method can enhance credit structure and collections performance and reduce collections costs. In some cases, the utility can impose a “lien-at-the-meter”: if the customer defaults on the finance payment, the utility service is suspended; it would be restored when the finance payments are brought current. In some cases, the bank may be the lender and can collect an integrated utility bill and loan payment; this method is being used in the IFC China Utility-based Energy Efficiency Finance program (see Section 7.2). The chosen method must be crafted consistent with applicable government and utility regulation and loan agreement terms with customers.

In the 2nd type of program the utility takes a greater role in project identification and selection of the implementers (ESCOs, equipment suppliers and/or service providers). The utility then either directly contracts or assists the customer to engage in a contract with the service providers for implementation services. Payments to the service provider are made by the utility and recovered through the customer bills. This type of program is more appropriate when there are not too many strong full-service ESCOs in the market and more direct action by the utility is needed to facilitate EE project implementation.

5.4 MECHANISMS FOR FACILITATING ESCOS AS PROJECT IMPLEMENTERS

ESCOs were introduced to China in the late 1990’s by the World Bank Energy Conservation Phase I Program (See Section 7.2) which supported start-up of three ESCOs or “energy management companies” (EMCs) sponsored by local governments and state-owned enterprises. The World Bank Energy Conservation Phase II program also helped found the EMC Association which now has over 100 members. The ESCO industry is still young and underdeveloped in China. This section reviews some of the potential mechanisms for facilitating ESCO implementation of EE projects.

Working with Many Types of Energy Efficiency Companies and Be Flexible with Business Models.

Many types of companies can deliver EE projects and services such EE equipment suppliers and manufacturers (for motors, controls, boilers, lighting, etc.); engineering companies; mechanical and electrical contractors. Many of these firms do not call themselves “ESCOs,” but have similar core capacities and may be much stronger and more established than self-proclaimed ESCOs. The goal of Program Administrators should be to build on and recruit these existing firms and their capacities to develop and implement projects. Various programs can be designed...
to engage these firms, for example, by forming an EE “Suppliers Network”. Thus, it is important to start with a broad definition of “ESCO” that includes all types of firms that can implement turnkey projects, but which perhaps do not offer financing. Services can also be provided to these firms to help them complete their ESCO offerings with proper contracts and financing. A variety of business and contracting models can be used to implement EE projects. Program Sponsors should be flexible to use a range of models to fit the capacities of EE companies and their customers.

Assisting ESCO's to develop their Business
ESCOs face several barriers to their business development. The two most important ones are (i) high costs and risks for selling and developing projects; and (ii) difficulties arranging financing, both debt and equity, for project financing. (See further discussion below). To address this first issue, Program Administrators can provide marketing, customer education, engineering and project development services to get energy users “decision ready” to make EE investments. This directly creates opportunities for EE equipment and service sales, and significantly lowers the ESCOs’ project development sales costs and risks.

Second, Program Administrators can organize financing for EE projects and equipment. For most EE companies, the best way to structure financing is with loans direct to the energy users. This structure does not require ESCO equity and does not rely on the ESCO balance sheet. Thus, more ESCOs can do business with this structure. A second preferred alternative is use of fixed payment energy service agreements which allow the ESCO to sell the end-user payments or more easily borrow from lenders by assigning the end-user payments.

Business Development Services for ESCOs
Program Administrators can provide the following finance-related business development services for ESCOs and EE companies to promote their business development.

- **Build capacity for financing and contracting skills in Existing ESCOs** - Engineering firms, mechanical and electrical contractors, equipment vendors and manufacturers and other trade allies offer various types of EE products and services and market to end-users. An ESCO, by definition, offers a complete, turnkey package of EE services, including financing. Performance contracting requires specialized contract documents and marketing skills. It also requires ability to successfully monitor and verify savings and willingness to assume certain performance risks. One method of facilitating ESCO development is to assist these already established companies in related EE businesses to complement their service offerings, -- including financing, and specialized contracting and marketing capabilities -- needed for them to offer complete ESCO-type service packages. This can be accomplished by adding in-house capabilities or joining with other firms, including international firms.

- **Provide Financial Advisory Services to Structure & Arrange Project Financing** - Many ESCOs typically need assistance in EE project finance structuring and investment preparation. Financial advisory services involves review of the projects’ economics, analysis of the experience and creditworthiness of key parties to the project, assessment of security and contract provisions required for the financing, development and negotiation of project contracts, preparation of detailed project financial and risk analyses, and identification of available sources of financing. With this information, the project financing can be structured and a business and financing plan for the project can be prepared for presentation to participating financial institutions. Financing solicitations would be made, a funding commitment negotiated and the transaction documented and closed. EE companies and financial institutions would be selected for assistance that have strong interest in developing on-going business in this field.

- **Develop multi-project finance facilities** - When arranging financing for one project, assistance can be provided to structure and arrange multi-project finance and vendor finance debt facilities with arrange with interested lenders.
FINANCING MECHANISMS WITH ESCO IMPLEMENTATION  SECTION 5

• **Develop standard contract provisions that support financing** - Development of standard energy services contracts is challenging because various companies consider their contract approaches unique and proprietary. Rather than developing a single standard energy services agreement, standard language can be developed for a set of key contract provisions which support financing. These contract provisions can concern insurance, equipment ownership and purchase option, termination value, assignment for financing purposes, lender cure and substitute manager; and energy user purchase commitments in event of ESCO default.

• **Assist ESCOs in business planning and raising equity capital** - Financial advisory support can also be provided for business planning, corporate finance planning and equity raising for select EE/ESCO businesses. Many EE businesses and ESCOs need equity for working capital and the equity component of their project financings. Assistance in securing this type of corporate finance can be helpful. Greater equity will improve an ESCOs prospects to secure debt facilities, allow them to responsibly assume performance risks and give them the working capital needed to develop projects.

• **Conduct ESCO Procurements** - A good way to organize the market and promote ESCO business is to conduct ESCO procurements on behalf of energy users. ESCOs need decision-ready clients, with proper information concerning energy cost, consumption and end-uses and inventories of their end-use equipment. Development of EE projects requires significant up-front at-risk expenses for energy audits, engineering, project contract development, sales and administration and arranging of financing. EE projects tend to have relatively high pre-investment development and transaction costs especially where EE markets are in early stages of development. An EE finance program can address the high development and transaction cost barrier and promote EE business and project development by supporting the project development efforts working directly with end-users. These efforts should focus on preparing projects for implementation on commercial terms and would intervene at key points in the project development cycle including: (i) marketing to end-user groups and creating awareness of EE potential and methods to capture it; (ii) energy audits and feasibility studies to identify EE investment opportunities; (iii) development of appropriate finance and contract structures; and, (iv) assistance to end-users to procure EE products and services including ESCO contracts where appropriate.

A powerful method to promote market development is to go directly immediately to conduct procurements. The Program Sponsor would identify and qualify customers with energy efficiency potential and then, acting on behalf of a single customer or preferably a group of customers, conduct a process to procure turnkey EE equipment installation and services. Because public sector end-users have generally stable and predictable end-use loads and hours of operation and provide essential public services they frequently represent good targets for EE projects and ESCOs. Working on behalf of the end-users, assistance in developing model procurement documents, conducting the procurements and negotiating and closing transactions is often needed.

The typical method is to develop and issue a request for proposals (RFP) to the EE industry. Prior to issuing the RFP, procuring agency should secure the customers' commitment to the program, assist the customers in defining their decision-making process and the acceptable range of financing and contracting terms, perform a preliminary analysis of the customer's creditworthiness, and assemble basic information on the energy cost, consumption and end-use characteristics for the customers' facilities. The RFP would also define the proposal format, evaluation and selection process. This preliminary work delivers to the ESCO community a qualified and "decision-ready" customer. In effect, the procurement process aids in organizing the market and lowering barriers to implementing projects. ESCO procurements can also have powerful demonstration effects on the market, motivate other customers to pursue similar transactions and help ESCOs break into a new marketplace.
SECTION 6

OTHER FINANCING MECHANISMS

6.1 CARBON FINANCE

Introduction

One of the benefits of improved energy efficiency and reduced energy consumption is the reduction in greenhouse gas (GHG) emissions. Organizations that contribute to reduction of GHG emissions can receive carbon credits that can be translated into funding using one of several existing mechanisms.

Increasing concerns regarding global warming led to the establishment of the Intergovernmental Panel on Climate Change (IPCC) to assemble and disseminate information on climate change. After the publication of an initial report by the IPCC, the United Nations Framework Convention on Climate Change (UNFCCC) was established through an international treaty to cope with climate change and to reduce global warming.

Under the UNFCCC, the Kyoto Protocol was adopted committing signatory industrial countries to reduce their GHG emissions by an average of 5.2% below their 1990 levels by 2012. Three implementation mechanisms were incorporated in the Kyoto Protocol to allow industrialized countries to meet some of their GHG reduction obligations by investing in projects in developing countries and economies in transition. Businesses, environmental NGOs and other “legal entities” may participate in the mechanisms, under the responsibility of their governments.

Mechanisms Established by the Kyoto Protocol

The Kyoto protocol established three cooperative mechanisms designed to help the industrialized countries decrease the cost of reducing emissions:

- International emissions trading which permits countries to transfer part of their allowed emissions (assigned amount units).
- Joint implementation (JI), which allows countries to claim credit for emission reductions arising from investment in other industrialized countries.
- The Clean Development Mechanism (CDM), which allows emission reduction projects in developing countries to generate certified emission reductions that can be sold and credited to industrialized countries to help them achieve their emissions reduction targets.

The mechanisms give the Parties (countries) and private or public sector companies, authorized by a Party to participate, the opportunity to reduce emissions anywhere in the world - wherever the cost is lowest - and they can then count these reductions towards their own targets. The funding channeled through the CDM should assist developing countries in reaching some of their economic, social, environmental, and sustainable development objectives, such as cleaner air and water; improved land use, and better quality of life.

The basic principles of the CDM are simple. Developed countries can invest in low-cost abatement opportunities in developing countries and receive credit for the resulting emissions reductions, thus lowering the reductions needed within their borders. While the CDM lowers the cost of compliance with the Protocol for developed countries, developing countries will benefit as well, not just from the
increased investment flows, but also from the requirement that these investments advance sustainable development goals. The CDM encourages developing countries to participate by promising that development priorities and initiatives will be addressed as part of the package. This recognizes that only through long-term development will all countries be able to play a role in protecting the climate.

From China’s perspective, CDM can:
- Attract capital for projects that assist in the shift to a more prosperous but less carbon-intensive economy.
- Encourage and permit the active participation of both private and public sectors.
- Provide a tool for technology transfer, if investment is channeled into projects that replace old and inefficient fossil fuel technology, or create new industries in environmentally sustainable technologies.
- Help define investment priorities in projects that meet sustainable development goals.

**Use of Carbon Financing for EE projects**

While the funding available from a CDM project may not provide 100% of the needed financing to a Project Implementer, it can be a valuable source of supplemental financing. CDM projects must qualify through a rigorous and public registration and issuance process designed to ensure real, measurable and verifiable emission reductions that are additional to what would have occurred without the project. The mechanism is overseen by the CDM Executive Board, answerable ultimately to the countries that have ratified the Kyoto Protocol. In order to be considered for registration, a project must first be approved by the Designated National Authorities (DNA), which in China is the NDRC which has designated energy efficiency as one of the priority areas for CDM projects.

**Project Development Procedures**

The CDM project development process defined by NDRC consists of the following steps:

1. Project owner, or together with its foreign partner, submits to NDRC project application, and documents as required by Article 12 above. Relevant departments and local governments may facilitate such project application;
2. NDRC entrusts relevant organizations for expert review of the applied project, which shall be concluded within 30 days;
3. NDRC submits those project applications reviewed by the experts to the Board;
4. NDRC approves, jointly with MOST and MFA, projects based on the conclusion made by the Board, and issues approval letter accordingly;
5. NDRC will make a decision on project application within 20 days (excluding the expert review time) as of the date of accepting the application. The time limit for decision-making may be extended to 30 days, with the approval of the Chair or the Vice-chair of NDRC, if a decision could not be made within 20 days. The project applicant should be informed of such a decision and its reasons.
6. Project owner invites designated operational entity to validate the project for registration; and
7. Project owner shall report to NDRC on the approval decision by the CDM Executive Board within 10 days as of the date of receiving the notice from the Executive Board.

The procedures for the project implementation, monitoring and verification are summarized below:

1. Project owner is responsible for presenting NDRC and designated operational entity project implementation and monitoring reports;
2. NDRC is authorized to supervise the implementation of the project to ensure the quality of the activity;

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3. Contracted designated operational entity verifies the emission reductions of the project activity and submits certification report to the CDM Executive Board, which will then issue CERs for the projects and inform its decision to the project participants; and

4. NDRC or other organizations entrusted by NDRC will put the CERs issued by the CDM Executive Board in file and record.

### 6.2 EQUIPMENT LEASING

#### Overview

A lease is a contractual arrangement in which a leasing company (lessor) gives a customer (lessee) the right to use its equipment for a specified length of time (lease term) and specified payment (usually monthly). Depending on the lease structure, at the end of the lease term the customer can purchase, return, or continue to lease the equipment. All imaginable types of organizations, including proprietorships, partnerships, corporations, government agencies, religious and non-profit organizations, use leasing throughout the world. Over 80% of American businesses lease at least one of their equipment acquisitions and nearly 90% say they would choose to lease again.

Depending on local tax and leasing laws, leasing companies can provide an important vehicle for commercial financing for energy efficiency projects. Many banks have leasing subsidiaries. In other cases stand-alone leasing companies also are often more aggressive than banks in probing new market segments. Leasing company partnerships with energy efficiency equipment companies can provide an important vehicle for energy efficiency technology with a financing solution. Such partnerships can provide important secondary markets and recourse vehicles to support credit structuring.

Equipment leases are broadly classified into two types: operating lease and finance or capital lease. In an operating lease, the lessor (or owner) transfers only the right to use the property to the lessee. At the end of the lease period, the lessee returns the property to the lessor. Since the lessee does not assume the risk of ownership, the lease expense is treated as an operating expense in the income statement and the lease does not affect the balance sheet.

In a capital lease, the lessee assumes some of the risks of ownership and enjoys some of the benefits. Consequently, the lease, when signed, is recognized both as an asset and as a liability (for the lease payments) on the balance sheet. The firm gets to claim depreciation each year on the asset and also deducts the interest expense component of the lease payment each year. In general, capital leases recognize expenses sooner than equivalent operating leases.

Since EE projects generally involve the installation of new equipment, leasing can become a viable option for such projects.

#### Equipment Leasing in China

China’s rapid economic growth story in recent years has provided an opportunity for the development of the equipment leasing industry. The growth of the leasing market has been enabled by the overall growth of the economy together with rapid growth of the underlying equipment market combined with the low existing leasing penetration rates. Additionally equipment manufacturers and vendors are increasingly recognizing the need to provide an equipment finance solution to complete their offering to their customers.

The equipment leasing and asset finance market has many segments and, in China, they are developing in different ways and at individual paces. While the IT and construction equipment segments are in general more mature lease finance concepts for energy saving and energy efficiency is an area of great potential. Against a background of China’s

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10 Susan Lee, Capital and Operating Leases, Federal Accounting Standards Advisory Board, October 2003.
drive for energy efficiency, leasing can play an important part helping to contribute to sustainable energy solutions.

Recent changes in the laws related to finance leasing have attempted to encourage the entry of foreign leasing companies into the Chinese market. Generally a rapid development of the market has been witnessed across the board, with a number of new players established in recent years – to positive effect. The increased knowledge base and the growth in general awareness of leasing as a valuable finance tool have supported industry expansion and development.

### 6.3 ESTABLISHMENT OF A SUPER ESCO

#### What is a Super ESCO?

Energy Service Companies (ESCOs) can be an important institutional mechanism for the delivery of energy-efficient investments. In recent years, many ESCOs have been established around the world to implement energy efficiency projects for energy users. However, the growth and development of the ESCO industry has been constrained in many countries by their access to financing. While in many cases ESCOs have successfully negotiated financing arrangements with commercial financial institutions, interest and willingness of commercial FIs to provide financing for EE projects has been limited due to a number of barriers, as discussed in Section 2 of this report.

A super ESCO supports capacity development and activities of others ESCOs, and provides financing for projects. It can also take the form of a leasing or financing company to provide ESCOs and/or customers with energy-efficiency equipment on lease or on benefit-sharing terms. A Government may promote the ESCO industry by setting up a super ESCO, which may act as an ESCO for the public sector (hospitals, schools, and other public facilities) and as an organization providing financing for smaller ESCOs operating in the private sector (industrial and commercial customers).

Since in the energy-efficiency business, the ESCOs' clients usually have stronger balance sheets than the ESCOs, the loan to the client is often used as an option, a common practice in North America. This creates two types of projects: shared savings projects, and guaranteed savings projects when the loan is to the client. In the long term, the super ESCO would build its balance sheet for evaluation by lending institutions by raising equity capital. The investor in the super ESCO will receive a risk-adjusted rate of return. When access to other forms of financing becomes easily available, and the ESCO market expands, the Government may transfer the super ESCO to the private sector.

#### Possible Role of Super ESCO in China

As a result of efforts initiated by the World bank (see Section 7.2), a number of ESCOs have been established in China and many more are being created. However, these are concentrated in certain Provinces, while in other Provinces few ESCOs are operating in the market. Also the growth of the ESCO industry has depended on the financing provided by the World Bank.

As pointed out in Section 4, the commercial banking industry is undergoing a transition in China and while the government and multilateral donors such as the World Bank, IFC and ADB have provided technical assistance and financial resources to commercial financial institutions, much more needs to be done to fully engage commercial FIs in EE project financing. Therefore it may be appropriate to consider a government sponsored super ESCO at a Provincial level to work with the existing and newly-formed ESCOs in EE project financing and implementation.

An example of the structure of a super ESCO is provided below.

#### Illustrative Example of Super ESCO

Figure 6.1 below illustrates the concept of the super ESCO.\(^{12}\)

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In this model, the super ESCO will be established by the Program Administrator to provide technical and financial support to private sector ESCOs. The super ESCO will be funded by the Program Administrator by establishing a revolving fund using government or other funds. The financial support provided by the super ESCO may include loans for project development and project financing for energy efficiency performance contracting projects undertaken by the ESCOs. The availability of financing from the super ESCO will allow the individual ESCOs to finance and implement a large number of EE projects, and the payments received by the ESCOs from these projects will lead to repayments of the loans from the super ESCO.

6.4 UTILITY FINANCING

What is Utility Financing?
Utility financing is a mechanism under which the electric utility provides the funds for the implementation of the EE projects. These funds may come from the utility’s own resources or from other sources such as special funds established by the government (see Section 3 on energy efficiency funds) or levies established by the regulator.

In some cases, the funds may come from a commercial financial institution. The funds are provided as a loan to the customer for equipment purchase, and loan repayments are recovered by the utility through the customer’s electric bill. In most cases, the loan repayments are arranged such that the amount of the repayment is smaller than the customer’s cost reduction from the energy savings created by the energy-efficient equipment. This allows the customer to be “cash flow positive” throughout the life of the EE project.

Illustrative Examples
Recent examples of utility financing of EE projects through the billing mechanism include the Bangalore Efficient Lighting Program (BELP) launched by the Bangalore Electricity Supply Company (BESCOM) in India, and the PROSOL program in Tunisia for installation of solar water heaters.

In the BELP program, the electric utility competitively selected manufacturers of energy-efficient Compact Fluorescent Lamps (CFL) based on price, quality and
warranties offered. Residential customers of BESCOM were able to obtain the CFLs from the manufacturers’ retail outlets. The customer signed an agreement with BESCOM to pay for the CFLs over a 9 month period through their electric bills. The Tunisian program was a joint effort involving the Tunisian Ministry of Industry, Energy, and Small and Medium Enterprises, and the National Agency for Energy Conservation (ANME). The solar water heating manufacturers and suppliers worked with commercial banks to arrange financing for customers interested in purchasing solar water heating systems. The customers agreed to repay the loan through their electricity bill. The electric utility collected the customer payments and repaid the banks.

**Advantages and Limitations**

The main advantages of utility financing are:

- Allows the customer to purchase EE equipment and pay for it from savings generated by the equipment
- Facilitates the customer’s repayment of the equipment purchase by collecting the payments through the electric bill
- Reduces the risk of default
- Improves the relationship between the utility and the customer

There are also some limitations to this approach:

- Many utilities are unwilling to enter into such arrangements to finance equipment purchase through the electricity bill
- The utility billing system may not be structured to handle the collection of loan repayments
- The regulatory system may not allow the utility to collect payments for equipment loans
SECTION 7

CASE STUDIES OF DSM/EE FINANCING

7.1 INTRODUCTION

This Section presents a set of case studies of financing programs for energy efficiency projects. Section 7.2 provides summaries of four financing programs in China:

- The World Bank Energy Conservation Financing Programs
- International Finance Corporation (IFC) China Energy Efficiency Financing Program
- Asian Development Bank (ADB) China Energy Efficiency Multi-Project Financing Program
- ADB Guangdong Energy Efficiency Power Plant Project

Section 7.3 provides case studies of three financing programs from Asian countries:

- Thailand Energy Efficiency Revolving Fund
- Korea Energy Management Fund
- India - State Energy Conservation Fund in Kerala

7.2 DSM/EE FINANCING PROGRAMS IN CHINA

World Bank Energy Conservation Financing Programs

With funding from the Global Environment Facility (GEF), The World Bank has been supporting the development of energy service companies (ESCOs) in China, as well as related contracting and financial mechanisms for the past decade.

Phase I: ESCO Development - In the Phase I of The World Bank/GEF China Energy Conservation Project, the World Bank provided loans, grants, and technical assistance to three demonstration ESCOs (these are often called EMCS, or energy management companies, in China), starting in 1997. Funds for the project came from both a World Bank loan for project finance and a grant from the Global Environment Facility (GEF). China’s first three ESCOs were created as new companies in Beijing Municipality, Shandong Province, and Liaoning Province. These three companies successfully pioneered the ESCO business in China beginning in 1998, adapting the energy performance contracting concept to the Chinese market and helped launch this industry. A number of other companies began to pick up the successful model.

Phase II: ESCO Loan Guarantee Program - In Phase II of the China Energy Conservation Project, the World Bank established a goal to mobilize local banks to provide ESCOs with debt financing for energy-efficiency (EE) projects. The project used a loan guarantee mechanism, with China National Investment and Guarantee Company Ltd. (I&G) a state-owned national guarantee company, acting as Guarantor. World Bank/GEF funds were provided through the Ministry of Finance, to serve as guarantee reserves and were made available on a formula basis for I&G to pay guarantee claims (see figure 7-1). With these resources, I&G has provided 90% loan guarantees to commercial banks that make loans to ESCOs for qualified EE projects. In addition, the World Bank supported establishment of the Energy Management Company Association of China (EMCA), as an institution to provide support to ESCOs, and as a way to provide technical
assistance to newcomers and to represent the emerging industry to the Chinese government and other parties.

The ESCO Loan Guarantee Program has helped create a bridge for many ESCOs into the world of formal financing. With the backing of $16.5 million placed in a special guarantee reserve fund held by the Ministry of Finance, I&G issued loan guarantees totaling about $52 million from 2004 through April 2008, in particular providing support for energy performance contracting project investments totaling about $90 million. Nearly 40 Chinese ESCOs have received loan guarantees for one or more of their projects. Twelve banks have participated so far. Efforts are being made to expand the business of the program, especially by continuing to develop new types of guarantee products.

The key features of the program are:

- GEF funds, through the Ministry of Finance, are used for program operations, technical assistance and guarantee reserves.
- The World Bank and China’s Ministry of Finance enter into guarantee program operations agreement with I&G.
- I&G markets, appraises and originates guarantees with ESCOs and banks. The guarantee is a three party agreement. 90% of the bank’s principal is guaranteed.
- Guarantee fees are paid by the ESCO as borrower.

The guarantees and associated loans have tended to be underwritten with traditional tools, such as working capital loans and secured primarily by the balance sheet, assets and counter-guarantees provided by the ESCOs themselves, independent of the EE projects being implemented. Further, the Phase II project requires that ESCOs to use a prescribed energy performance contracting approach, and the ESCO must be the borrower of the project loan. Loan guarantees cannot be provided if the ESCO and end-user want the end-user to be the borrower. This underwriting approach has limited the business volume of the Phase II program. In addition, the loans have tended to have very short terms, typically three years or less. The loan underwriting fails to take advantage of the security and debt service capacities of the projects themselves, and exposes I&G to unnecessary risks. “Project-based lending” methods, defined as lending where the ESCO’s projects themselves provide the primary source of security for the loan and guarantee and the source of revenues for debt service payments, could be applied on a prudent basis in this and other cases to increase the volume of loan guarantees, to the benefit of all parties.

Phase III: Energy Conservation Program - The existing industrial energy conservation financing mechanisms in China have mainly benefited relatively small projects. Phases I and II have been instrumental in the development of China’s energy services industry. The energy management companies (EMCs) supported by the two projects made US$245 million worth of energy conservation investments in 2005, many of them in the industrial sector. However, few of the EMC investments exceeded US$5 million.

For Phase III of the Energy Conservation Project in China, the World Bank has chosen to focus on the financing of large industrial projects, consistent with Government policy. The World Bank will provide a $200 million loan, through the Ministry of Finance, which will be passed through to
participating banks for on-lending to large (up to $25 million) industrial energy efficiency projects.\textsuperscript{13} The Phase III project also includes $13.5 million in GEF funding for technical assistance activities, including capacity building in participating and non-participating banks. The Phase III project will be instrumental in providing long-term loan resources for EE projects, and will help to engage new banks in this market.

**IFC China Energy Efficiency Financing Program**

The International Finance Corporation (IFC), the private sector investment arm of the World Bank Group, has operated the China Utility-Based Energy Efficiency Finance Program (CHUEE) since June 2006. CHUEE supports services such as marketing, project development, and equipment financing for energy users in the commercial, industrial, institutional and multi-family residential sectors, in order to implement EE projects in China. CHUEE brings together financial institutions, utility companies, and suppliers of EE equipment to create a new financing model for the promotion of energy efficiency. CHUEE cooperates with Chinese commercial banks and offers them a facility whereby IFC shares part of the loss for all loans within the GHG emission reduction portfolio. The program also provides technical advisory services related to marketing, engineering, project development, and equipment financing services to banks, projects developers, and suppliers of EE and renewable energy products and services.

The loss-sharing agreement with the first bank partner, Industrial Bank, and partnership agreement with Xin’ao Gas were signed in May 2006. IFC began implementation of the program following approval of the CHUEE risk-sharing facility by China’s foreign exchange regulator (SAFE) in December 2006. In June 2007, IFC signed the loss-sharing agreement with the second bank partner, Bank of Beijing.

The structure of the risk sharing facility is illustrated in Figure 7.2 above.

\textsuperscript{13} HuaXia Bank and China Export Import Bank are the current candidates.
2007, 37 projects had been approved by these two banks, accounting for a total energy efficiency loan portfolio of US$84.8 million (Industrial Bank, 82 million; Bank of Beijing, 2.8 million) with associated GHG emissions reductions in excess of 2 million metric tons per year.

IFC managed the CHUEE technical assistance and advisory service programs for all partners through its Beijing office, including the development of marketing strategies, training in credit underwriting for the banks, and support for loan origination and structuring for marketing partners and energy end users. In 2007, CHUEE also conducted market research for particular regions and/or industries to help major players in the sector identify potential business opportunities and design tailored financial products. CHUEE also supported research in the EE regulatory environment, in order to benefit a wide range of stakeholders both inside and outside of IFC.

A second Risk-Sharing Facility and a larger Technical Assistance Package (CHUEE II) was approved by IFC in 2008. CHUEE II supports a total line of credit of US$347 million and provides technical assistance to two bank partners. The Norwegian government, as one of the donors, has committed to provide funding for technical assistance and advisory services.

IFC is now developing its “CHUEE III” investment program, and is exploring collaboration with the CDM Fund of the Chinese government, through which the CDM Fund would provide additional first loss reserves to expand the IFC risk-sharing program.

The IFC CHUEE program generates new EE projects for financing through multiple marketing channels. One is partnerships with utilities, as illustrated in Figure 7.3 below.
• IFC program under way in China, with Industrial Bank and Bank of Beijing.

• Program uses multiple marketing channels. Deal flow is generated from (i) relationships with EE/ESCO companies; (ii) utility partnerships, and (iii) bank customers and direct marketing.

• Xinao Gas is utility partner. Utility markets program and EE projects to customers; EE project development services provided to customers.

• Bank partner provides financing to utility customers. Loan payments and collections are integrated with utility bill; loan default suspension of gas service.

Other marketing channels include: multi-project finance facilities with ESCOs, vendor finance programs, direct solicitation of existing bank industrial customers and collaboration with energy conservation programs of provincial and local governments. In effect, IFC is using a range of marketing strategies and working with several types of market aggregators to generate EE project finance business for its partner banks.

Asian Development Bank China Energy Efficiency Multi-Project Financing Program

In 2008, the Asian Development Bank (ADB) approved a new EE finance program in China. The operating details are still under development. The program provides 50% partial credit guarantees to Partner Banks, with a maximum ADB liability of RMB 800 million. The program also recruits and works with a technical partner to provide technical due diligence for banks and project pipeline investment preparation services. This technical partner has potential to be a “super ESCO” market organizer. Potentially a number of different technical partners will be able to participate. The program includes technical assistance for participating partner banks, using a services menu similar to that described in Section 4.4. The program will also use vendor finance agreements between partner banks and participating leading EE equipment vendors. The first such program is being developed between Standard Chartered Bank and Johnson Controls, Inc.

ADB Guangdong Energy Efficiency Power Plant Project

ADB is also implementing an EE financing program with Guangdong Province. ADB has approved a $100 million sovereign loan (guaranteed by the Chinese Government). The loan funds will be on-lent to Guangdong Province and used to establish a special energy conservation project loan fund. The Guangdong Economic and Trade Commission will be responsible for establishing a program management office to implement the program. The loan fund will be managed by the Guangdong Fiscal Bureau. The loan fund will target implementation of electricity savings projects with the goal of assembling a portfolio of EE projects with energy and demand characteristics similar to a 300 MW power plant. The program focuses on industrial motors, lighting, transformers, and appliances in medium and large industrial customers as well as large end users in the commercial and public/institutional sectors. ESCOs are also eligible as borrowers. The program includes rigorous technical origination procedures. Security procedures for the loans are still being developed.

Guangdong Province also has an “Energy Savings Project Special Fund”, which can provide capital incentives for projects. Monies for the special fund may derive from fiscal appropriations, grants from ADB, an electricity bill surcharge, and CDM revenues. The Guangdong Economic and Trade Commission is also considering creative uses of the special fund to enhance credit; to reduce the interest expenses on project loans so as to provide an added incentive to borrowers; to support project development costs so as to prepare more projects for investment; and to finance general marketing campaigns.

7.3 DSM/EE FINANCING PROGRAMS IN OTHER ASIAN COUNTRIES

Thailand Energy Efficiency Revolving Fund

In 2003 Thailand’s Department of Alternative Energy Development and Efficiency (DEDE) launched the “Energy Efficiency Revolving Fund (EE Revolving Fund)”, which is aimed at stimulating the banking community’s interest in
lending to industry for energy conservation projects with minimal government intervention.

Monies for the EE Revolving Fund come from Thailand's Energy Conservation Promotion Fund (ENCON Fund), which is financed by a levy on petroleum products sold in Thailand, with the aim to fund sustainable energy initiatives and incentive programs, as well as research and development.

DEDE initially provided funding to participating banks at zero interest, on the condition that banks charge their customers at 4 percent interest or less. Subsequently, it charges 0.5 percent interest to cover administrative costs.

Prior to the initiation of the EE Revolving Fund in 2003, the financial sector had little or no interest in energy-saving projects. According to sources at DEDE, Thai commercial banks were more interested in lending for manufacturing expansion or new construction. Under conventional practices, small companies interested in improving EE would be hard-pressed to post sufficient collateral for loans. But as banks have become more familiar with EE projects, they are beginning to take into consideration the projects’ energy-saving potential, which can be translated into profit and thus make it possible for smaller enterprises to proceed with their projects.

While corporate lending favors large and strong companies, project financing favors well-planned, technically-sound projects that can be undertaken by small- and medium-sized enterprises without the collateral guarantees.

Technical support from DEDE helps give banks the confidence needed to consider EE projects, even without technical or engineering staff of their own. DEDE plays a key role in educating clients about energy efficiency when Bank staff go to meet their clients.

According to DEDE, the number of approved projects as of October 2008 includes 198 factories, 35 buildings and 4 energy service companies, with a combined total investment of nearly $290 million. Of this amount, the loans approved under EERF amounted to more than $150 million. This resulted in electricity savings of more than 750 million kWh per year and nearly 200 million liters of oil per year.

Energy researchers and academics suggest that the project be sustained for the long term to maintain momentum for EE improvements in industry. Without such an incentive, they fear, business will keep postponing implementing projects to the detriment of the country’s energy-saving policy.

DEDE has initiated another project that will help fill the void left over after discontinuation by EE Revolving Fund. A new ESCO Fund has been set up with more than $14 million reserves for small- and medium-sized enterprises interested in investing in energy conservation projects.

**Korea Energy Conservation Fund**

Korea’s rapid economic expansion has resulted in a greatly increased demand for energy nationwide. In order to lessen the burden of expansion on energy use, the government sought, early on, to invest in the development and implementation of energy efficiency measures. In 1980 the Korean Government established the Korea Energy Management Corporation (KEMCO) under the 1979 Rational Energy Utilization Act. KEMCO has a budget of approximately US$ 1 billion per year and focuses on promotion of energy efficiency in industry, appliances and buildings, energy technology promotion of new and renewable energy, promotion of energy service companies (ESCOs), and financing energy saving projects. KEMCO’s programs are supported by a tax credit of 10% on energy efficiency investments.

In 1980, the Korean Ministry of Knowledge Economy (MKE) established the Korea Energy Conservation Fund (“Fund”) to promote the development of energy efficiency initiatives by providing long-term, low interest loans for investments in energy efficiency projects. MKE has assigned KEMCO to manage the Fund, which offers loans for a wide
array of projects, the majority of which may be classified into one of the following three categories:

- **Rational use of energy** – which includes the establishment of cogeneration facilities for industry or building, installation of energy efficiency & conservation facilities, and ESCO projects

- **Integrated energy supply** – including the establishment of District Heating, Community Energy Systems, and Industrial Complex CHP (combined heating and power systems)

- **Dissemination of new and renewable energy** – which pertains to the installation of technology which utilizes alternative energy forms such as solar-heat, solar-light and bio-energy

In 2008 the total amount of loans disbursed by the Fund was $710 million, of which $480 million were for energy efficiency projects. In 1992, KEMCO initiated an official ESCO program in order to promote and regulate the budding ESCO industry in Korea. Since its founding, 156 ESCOs have registered with the government, and about 30-40 ESCOs are actively pursuing and implementing energy efficiency projects. Most of these ESCOs use the Shared Savings model of performance contracting. KEMCO provides some financing from the Fund to commercial banks, for on-lending to ESCOs, to support their operations. During 2007, $136 million of loans were provided to ESCOs to implement 106 projects.

Over the past decade, KEMCO has developed a range of support mechanisms for ESCOs:

- Establishment of an operating fund for small & medium sized ESCOs (1998)
- Development of a credit loan system (1998)
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Figure 7-4. Projects Funded by the Korea Energy Conservation Fund

- Creation of a factoring system (1999)
- Founding of the Excellent ESCO program, an accreditation program for superior ESCOs (2006)

Figure 7.4 shows the amount of loan funds provided by KEMCO (working through commercial banks) to ESCOs over the last 15 years.

India - State Energy Conservation Fund in Kerala

The Energy Conservation Act, 2001

Recognizing the need for increased implementation of energy efficiency, India passed the Energy Conservation Act, 2001 (EC Act), the most important legislative initiative related to energy efficiency in India’s history. Its purpose is to “provide for efficient use of energy and its conservation and for matters connected therewith or incidental thereto.” One of the key elements of the Act as it related to Indian States is the mandatory requirement for the establishment of a designated agency “to coordinate, regulate and enforce provisions of this Act within the State,” and the specification that each State establish a State Energy Conservation Fund for the purposes of promotion of efficient use of energy.¹⁴

In response to these requirements the State of Kerala has recently developed the structure of the Kerala State Energy Conservation Fund (KSECF) and drafted the implementing rules for the KSECF.¹⁵ It is anticipated that this Fund will be operational in 2009.

Objectives and Scope

The objectives and scope of the KSECF are to:

- Support the financing of specific EE projects using options such as debt financing, equity financing, grants, and credit or risk guarantees to financial institutions.
- Contribute to the development of the EE market in Kerala by financing projects with private sector implementation through ESCOs.

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Box 7-2. Summary of the Korean Energy Conservation Fund

Objectives: Stimulate and leverage commercial investment for EE improvement; provide incentives for industrial-sector energy efficiency projects

Implementing agency: The Korea Energy Management Corporation (KEMCO) under the Ministry of Knowledge Economy (MKE)

Start date: 1980

Loan period: Maximum 15 years

Loan channel: Fund managed by KEMCO

Eligible borrowers: Factories, buildings, and energy service companies (ESCOs)

Eligible investment: Equipment and installation costs for factories and buildings; consultancy fees; civil works, piping and necessary components; associated costs — removal of existing equipment, transportation, taxes

Interest rate: 3-4%

Eligible projects: End-use energy efficiency, supply-side efficiency, renewable energy

Total loan funds (2008): US$710 million, of which:

- Loan funds for end-use efficiency: US$480 million
- Loan funds for combined heat and power: US$100 million
- Loan funds for new and renewable energy: US$130 million

Total savings from Fund: 700,000 toe/year

Management and Operation

The KSECF will initially be managed by the Energy Management Centre, Kerala, the agency designated by the State to comply with the requirements of the EC Act. The Department of Power of the Government of Kerala will initially (current budget year) provide funds amounting to about $250,000 from the State budget. It is anticipated that the Bureau of Energy Efficiency (BEE), the national agency created by the EC Act shall provide matching funds for the KSECF. It is anticipated that the Fund size will grow in future years with potential funding from sources such as an electricity surcharge, budget allocation from the State legislature, special taxes or levies, government bonds, funds from the Bureau of Energy Efficiency (BEE), bilateral and multilateral donor agencies, commercial financial institutions, and international financial institutions; fees from certification and labeling; and carbon financing.

- Develop and demonstrate model financial transactions.
- Develop model financing agreements that can be used by the private sector:
- Build the capacity of local financial institutions in EE project transactions to increase their knowledge, interest and capability for financing such projects
- Leverage commercial funds and create a sustainable market for EC project financing.
- Alleviate the power shortage and related impacts on the state economy.
- Meet the mandated requirements of the EC Act, 2001.

The KSECF will:

- Facilitate increased implementation of EE projects by large energy users.
- Engage commercial financial institutions to participate in EE project financing.
- Facilitate ESCO industry development and participation in EE project implementation.
- Demonstrate leadership in EE through implementation of EE projects in the public sector.

Box 7-3. Kerala Energy Conservation Fund Financing Mechanisms

Energy Audit Subsidy Scheme - KSECF is designing a subsidy to industrial, commercial and institutional facilities for conducting energy audits to encourage and promote the identification of EE opportunities.

“Interest Buy-Down” Scheme - KSECF is working with commercial financial institutions and provide them a payment that will enable them to significantly reduce the interest charged to the borrowers, thereby improving the project economics to the Project Implementers. This Interest Buy-Down Scheme will allow KSECF to facilitate financing for a larger number of projects with the available resources.

Energy Efficient Appliance Financing - KSECF is creating, in cooperation with a local financial institution and manufacturers of energy efficient refrigerators and air conditioners, an Energy Efficient Appliance Financing (EEAF) scheme that will provide zero interest financing and manufacturer rebates on high efficiency refrigerators and air conditioners.

Energy Efficiency Grants for Public Sector Projects - KSECF offers grants for energy efficiency projects in the public sector to encourage and promote the implementation of such projects in cases where the project has a high social value and the Project Implementer is not able to obtain funding for the project without some assistance in the form of a grant.

Performance Contracting - KSECF will provide assistance to public agencies in Kerala to adopt the performance contracting process for implementing energy efficiency projects. KSECF is developing the rules and procedures for engaging ESCOs under performance contracts and to assist interested public agencies in developing the Requests for Expressions of Interest for qualifying and short-listing ESCOs and the more detailed Requests for Proposals to select the ESCOs. KSECF will provide the technical assistance, funding and other needed resources for implementing the performance contracting process.

Partial Credit Guarantee Scheme - The Government of India launched a Credit Guarantee Scheme to strengthen credit delivery system and facilitate flow of credit through the Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE). KSECF will cooperate with this agency to facilitate partial credit guarantees for EE projects.

As the fund size grows, EMC will have to add substantial capacity in the area of financing and financial management. Therefore, it has been recommended that the Government of Kerala (GOK) consider the engagement of a professional fund manager under the direction to administer and operate the Fund.

Financing Mechanisms

KSECF is implementing a number of financing mechanisms to promote and facilitate EE projects (see Box 7-3 above)\textsuperscript{16}:

Potential Replication in Other States

The national Bureau of Energy Efficiency has been assisting the State of Kerala in establishing the KSECF and is expecting to use the experience from KSECF to assist other Indian States to set up similar Funds. Already the State of Madhya Pradesh (MP) has designed the MP Smart Energy Fund\textsuperscript{17} with technical assistance from the Asian Development Bank (ADB), and other States such as Maharashtra have commissioned studies to design their state funds.


\textsuperscript{17} Natarajan, Bhaskar, State Energy Smart Fund for Madhya Pradesh, presentation to MP Department of Finance and Department of Energy, March 2009; and Kothari et al, Formation of State Energy Smart Fund for Madhya Pradesh, Report prepared for the Asian Development Bank, August 2008.
8.1 INTRODUCTION

This annex highlights the fact that there are many different options and mechanisms for financing EE projects. Sections 3 through 6 provide a discussion of the different types of mechanisms and Section 7 provides a number of illustrative case studies. The key lesson learned from international experience is that the selection of the optimum financing approach and mechanism(s) will vary across different countries and also within a country from region to region.

The applicability and benefits of financing mechanisms for a particular province in China will depend on a number of local factors and characteristics including:

- Characteristics of the energy users
- Portfolio of DSM programs and related implementation approaches and financial incentives
- Goals and objectives for energy savings
- Existing financing activity in the market by energy users, financial institutions and ESCOs
- Barriers to increased financing of EE projects
- Technical capacity within FIs and ESCOs for implementing innovative financing mechanisms

The following section identifies the key steps in a “road map” for the selection and implementation of financing mechanisms to promote and facilitate increased implementation of EE projects.

8.2 KEY STEPS

The following are the key steps:

1. Define DSM Portfolio - The Program Administrator develops the portfolio of DSM programs that may include a mix of audits, rebates, direct install, standard offer and DSM bidding approaches, along with the definition of the implementation strategies and financial incentives for each type of program.

2. Identify Targets by Market Sector/Segment - The Program Administrator also identifies the target market sector(s) and segments (for example, specific industrial sectors/segments such as steel, chemicals, paper, etc.). For each sector the Program Administrator also identifies the targets for the DSM program results including energy savings and other performance parameters.

3. Assess Current Financing Activities (Customers, ESCOs, FIs) - The next step is to identify the current status of financing activities supporting the implementation of the EE projects intended to meet the specified targets. This will include an assessment of the maturity of the market in terms of the roles of ESCOs and commercial financial institutions.

4. Identify Barriers - The results of Step 3 are used to identify the existing barriers to large scale financing of EE project implementation.

5. Assess Existing Mechanisms to Address Barriers - In this step an assessment is carried out to determine
to what extent the program designs (from Step 1) will address some of the existing barriers and to what extent additional financing mechanisms may be needed.

6. **Identify New Financing Mechanisms** - The results of Step 5 lead to the identification of potential new financing mechanisms to promote and stimulate increased EE project implementation.

7. **Assess how these will address the Barriers** - Once the potential new mechanisms have been identified, this step involves an assessment of how these will address the barriers identified in Step 4.

8. **Select New Mechanisms** - Based on the results of the assessment in step 7, the best new financing mechanisms are selected for implementation.

9. **Implement Financing Mechanisms** - The selected mechanisms are then implemented in cooperation with the stakeholders (who may include government agencies, ESCOs, FIs and donor agencies).

10. **Provide Information and Technical Assistance as Needed** - The final step is to develop and implement an information and communication program combined with appropriate technical assistance to facilitate the stakeholders to effectively and efficiently implement the new mechanisms.
ANNEX A
GLOSSARY OF FINANCING TERMINOLOGY

Baseline: Term used in measurement and verification of energy savings to define the energy use, and factors affecting energy use, in a given facility prior to implementation of an energy efficiency (EE) project.

Build-Own-Operate-Transfer (BOOT): A form of contract whereby a contractor/investor builds a project, owns it and operates it under long-term agreement with an end-user or public sector entity, and transfers ownership at the end of the contract term or earlier. Agreement term is usually for well less than the useful life of the project assets. “Build-Own-Operate” is a similar contract form except that contractor/investor maintains ownership for the duration of the project’s useful life.

Business Plan: A document fully describing a company’s business and future plans, prepared both for internal purposes to guide the company’s development, and for external purposes to present the company to potential investors.

Cash flow Projection: An estimate over several years of a project’s or company’s cash flow and income statement, summarizing all revenues and expenses, including debt service, year-to-year or month-to-month; the period of analysis is usually the same as the debt term. Cash flow projections are used to estimate debt service coverage and investor returns.

Collateral: The physical and contractual assets pledged by a borrower or lessee as security for amounts owed to a lender or lessor.

Collateral value: The cash value which a lender can realize from collateral which is repossessed and resold in the event of borrower default.

Credit Analysis: The analysis which a lender undertakes to determine the creditworthiness of a borrower or other party on whose commitments a lender relies for loan repayment. Analysis is conducted on financial statements (balance sheet and income statements) as well as on a range of topics pertaining to party or business including business track record and future prospects, payment record on prior loans or other obligations (e.g., utility bills), management, and other matters.

Credit Enhancement: Some extra security provided to lenders to support a loan, for example, extra collateral, guarantees from a party (such as a financial institution, other project participant or government) other than the borrower, a debt service reserve, etc.

Credit Rating: A rating given by an independent credit rating agency reflecting the creditworthiness of a given entity or loan transaction and assessing the ability of a bond issuer or borrower to make full and timely payments of principal and interest due to lenders/investors. The judgment of the rating agency is based on thorough professional credit analysis.

Creditworthy: Term describing a party, project or other entity that is considered worthy of receiving credit or a loan.

Concession Contract: A long-term contract whereby a contractor/investor assumes use of existing infrastructure assets, such as a power plant or a water treatment plant, agrees to undertake an investment program to upgrade the assets using own investment funds, provide investment, operations and management services to operate the asset and deliver services back to the original asset owner for a specified term.
**Concessional Finance:** Funding that comes from government, donor, or other sources and seeks to achieve developmental and/or environmental objectives, but also work in conjunction with commercial finance.

**Debt Capacity:** The total amount of debt which a borrower can prudently support given its estimated revenues and expenses, its equity base, the risks it faces, and the terms of available debt.

**Debt/Equity Ratio:** The ratio, in a firm or a project financing, of total debt to total equity in the firm or project’s sources of funds. The higher this ratio, the greater the financial leverage and financial risk, as debt must be repaid according to schedule, and equity returns derive from net income after debt service.

**Debt Placement Memorandum:** A document prepared by or for a prospective borrower for soliciting debt for a project financing which addresses all issues a lender must assess to make an affirmative lending decision.

**Debt Service:** All monies owed by a borrower to a lender including principal, interest and fees. Periodic debt service is the sum of principal and interest due to the lender for a defined period.

**Debt Service Coverage Ratio (DSCR):** A key measure of a project or company’s ability to support debt financing, and equal to A/B where: (A) funds available for debt service, in the numerator; to (B) Debt Service, in the denominator. Funds available for debt service equals project or company revenues less all operating costs. A target debt coverage ratio will be set by a lender typically based on an analysis of project and company risks and future potential variability of funds available for debt service. Ratios of 1.20 to 1.50 are typical.

**Debt Service Reserve Fund:** A special fund set aside by a borrower, usually in an escrow account, as required by and for the benefit of the lender to provide a source of funds to meet debt service payments in event that the borrower’s project or company has insufficient cash flow to meet a current then due debt service payment. A debt service reserve fund equal to three to six month’s debt service payments is typical.

**Demand Side Management (DSM):** Programs and investments undertaken by a utility to manage, shape, strategically increase and/or reduce the energy consumption and/or demand, especially during peak load periods, as a means for improving overall utility system efficiency, profits and/or social and environmental goals.

**DSM Contracting:** Contracts undertaken by a utility with EE/DSM providers to deliver saved energy and capacity.

**Due Diligence:** Analysis conducted by a lender or investor on a given project and/or company to determine whether or not to make a loan or investment.

**Energy Audit:** A report and analysis summarizing a given facility’s energy use, consumption, cost, energy using systems and equipment and opportunities/measures for saving energy, reducing waste and improving efficiency. Measures can be no- and low-cost measures, involving operations changes and minor investments, and capital measures requiring greater investment. Estimates of the capital costs and cost/benefit analysis of the measures is included. A “Preliminary” or “Walk-through” energy audit is typically done quickly to provide initial information, with a margin of error of +/-15% typically, and guide decisions on measures to investigate further in a “Detailed” or “Investment Grade” Audit which provides high quality information that can be used to make investment commitments.

**Energy Savings Guarantees:** A guarantee made by an ESCO that a certain level of energy savings will be achieved by an energy efficiency investment program. The guarantee must specify the energy savings measurement and verification system and all conditions of the guarantee. The guarantee typically includes exclusions for certain actions by the end-user, such as changing hours of operation, and other factors beyond the control of the ESCO such as weather and energy prices.

**Energy Services Agreement (ESA):** The ESA is title typically given to the main contract between an ESCO company and an end-user defining the scope, terms and conditions for implementation of an energy efficiency project by the ESCO at the end-user’s facilities. A variety of ESAs are used in business practice.
Energy Services Company (ESCO): A business that develops, engineers, installs, provides or arranges financing and provides operations services for projects designed to improve the energy efficiency and maintenance costs for facilities under long-term typically five to 10 year contracts. ESCOs operate with a range of business models. ESCOs generally act as project developers for a wide range of tasks, packing a complete set of project services for their customers and assuming the technical and performance risk associated with the project.

Equity: In the context of analyzing a balance sheet, equity refers to Net worth, or assets minus liabilities. In the context of a project financing, equity refers to an investment contribution, usually in cash, by the project owners toward the total project capital costs.

Escrow Account: A deposit held by a trustee or fiduciary (often a commercial bank) for use for a specified purpose, e.g., debt service. In a project financing, an escrow account is often used to channel funds needed to pay for debt service.

Exit Strategy: Usually used in the context of an equity investment, exit strategy refers to the potential ways for an investor to have their investment returned, e.g., through dividend payments, through repurchase of stock by the project/company sponsor; by going public and establishing a public market in the equity, etc.

Extended Warranty: A warranty given by a contractor or equipment vendor backing the performance of newly installed equipment for a term beyond the normal one year. Extended warranties may be sought for the term of debt for a project financing.

Feasibility Study: A study assessing the economics and technical viability of a given project and other factors affecting the ability and practicality of implementing the project.

Financial Product: An offer of financing -- including terms, conditions, pricing, security and documentation requirements -- made by a financial institution addressing the financing needs of a particular market or sector.

Financial Structuring: The process of devising a financial plan for a project that meets the objectives of all parties including borrower and requirements of the lender. The financial plan includes terms and conditions for the project loan all relevant contracts and a financial analysis of the project.

Full Recourse: Effectively a guarantee provided by a borrower or third party agreeing to repay a loan without condition.

“High-level” Selling: Selling by an EE/ESCO company to top management officials of a firm or entity that manage or have financial responsibility and decision-making authority over multiple facilities.

HVAC: Heating, ventilating and air conditioning.

Integrated Resource Planning: Plans developed by a utility to meet its growth in power/energy demand through both supply of new resources and demand side management programs and investments.

Internal Rate of Return: Is the discount rate which, when applied to the project’s net operating benefits (or income) results in an NPV exactly equal to the project’s capital cost or equity investment.

Lease: A lease is a contract between a lessor and a lessee whereby the lessor finances purchase of the equipment and the lessee acquires use of the equipment in consideration for making payments over the lease period.

Lease or Loan with Guaranteed Savings: The combination of (1) a lease or loan (between end-user and financial institution) financing an EE project with (2) an Energy Services Agreement with an energy savings guarantee (between end-user and ESCO) for implementing an EE project.

Leverage: The use of debt, by a project to enable the project to be financed with less equity; the portion of a project that is financed with debt and expressed in terms of the debt/equity ratio in a project’s financing plan. In the context of concessional finance, the amount of total project investment that is supported or stimulated by the concessional financing. Also called “gearing”.

Equity: In the context of analyzing a balance sheet, equity refers to Net worth, or assets minus liabilities. In the context of a project financing, equity refers to an investment contribution, usually in cash, by the project owners toward the total project capital costs.
Limited Recourse: A guarantee provided by a borrower or third-party to a lender committing to repay a loan but within defined limits or conditions; less than full recourse.

Lock-Box: Similar to an escrow account, an account where revenues or funds are deposited to be dedicated to pay debt service or some other obligation.

Master Loan or Master Lease Agreements: Loan or lease agreements that contemplate and are designed for financing a series of similar projects with a given borrower over a period of time.

Measurement & Verification (M&V): Measurement and verification of energy savings for a given EE project based on agreed engineering calculation methods which usually include a baseline energy use, as existed before the EE project implementation, and metering instruments.

Minimum Take: A commitment in a power sales or energy/thermal sales agreement for the energy purchaser to take or purchase a minimum quantity of energy. Minimum take provisions are often necessary for project financing to assure a base minimum level of energy sales and hence revenues for a project. Can also apply in other output sales agreements, e.g., water supply.

Multi-Project Loan Facility: A loan facility that contemplates and defines terms, conditions and procedures for financing multiple projects. Useful for ESCOs and other project sponsors who will implement a series of similar projects to define in advance debt financing terms.

Net Present Value (NPV): A single number calculated by discounting the flow of the project’s estimated net benefits, (same as funds available for debt service, i.e., net operating income before debt service) to present currency units. The discount rate used can be equal to the desired rate of investment return. If the NPV is greater than the project’s total capital cost, then the investment is warranted.

Non-Recourse: No guarantee or obligation to pay. A non-recourse project financing means the borrower or project sponsor is not obligated to repay a loan except with revenues, security and assets of the project itself.

Outsourcing: An end-user obtaining some service from a contract provider rather than providing the service to itself with its own staff.

Performance Guarantees: The guarantee by an equipment or service provider of the effective performance of the equipment or project/system, as measured by defined specifications and measures.

Preferred Drawing Rights: A provision included in a loan agreement whereby the borrower authorizes the lender to be paid periodic debt service payments automatically from the borrower’s primary bank account. Withdraws for debt service would be paid on a priority basis relative to other uses of funds in the account.

Prepayment Options: The option and right of a borrower to pay a loan early, in whole or in part. The lender and loan agreement may impose some premium or penalty for prepayment. A loan or any type of finance agreement should define prepayment options and prices, relative to outstanding principal balance of the loan or financing.

Project Capital Cost: Total cost to complete construction of a project including all equipment and installation as well as all development, commissioning and other soft costs.

Project Completion: Formally means when a project has not only been completely constructed and installed but is also ready for operations, has passed any acceptance and commissioning tests and been accepted by the project owner and, if applicable, the project lender.

Project Development Agreement: An agreement between an end-user and energy services provider defining how the parties will proceed to develop a project, the project development steps and roles and responsibilities of each party. Terms for project implementation are typically defined in a preliminary way.

Project Development Cost: All costs to prepare a project to the point of commencing construction including energy audit, engineering, sales and legal costs.

Project Development Plan: A business plan for a project, prepared by or for the end-user typically, which describes
a project and how it will be implemented, and thereby providing a basis for decisions by end-user management board on project implementation. Useful for larger projects and in large organizations.

**Project Finance:** A form of financing in which lenders look solely or primarily to the cash flows and physical and contract assets of the project being funded as the source of funds for payment of loan debt service and source of loan collateral and security. Also know as limited- or non-recourse finance.

**Project Financial Analysis:** An analysis of a project’s estimated financial performance that incorporates all known factors including financial plan, sources and uses of funds, terms and condition of debt financing, cash flow projection (estimated revenues and expenses), income statement and balance sheet, and used by project sponsors, lenders and equity investors to assess the project’s ability to meet debt service payments and generate satisfactory returns to investors.

**Rebate:** A cash grant covering a portion of the cost of specified equipment, usually paid after the equipment is purchased and installed. A common method for utilities and other donors to buy down for end-users the capital cost of EE equipment they want to promote.

**Remarketing Agreement:** Commitment by an equipment vendor to remarket, i.e., resell, equipment which a lender repossesses in event of default by the borrower who purchased the equipment originally. Useful for lenders as a way to realize the collateral value of repossessed equipment.

**Repurchase Agreement:** Commitment by an equipment vendor to repurchase, for a defined price, equipment which a lender repossesses in event of default by the borrower who purchases the equipment originally. Stronger than a remarketing agreement as a means for a lender to realize the collateral value of repossessed equipment.

**Request for Proposal (RFP):** A document prepared and issued by a firm or entity to solicit proposals for purchase of EE services, projects or equipment.

**Risk Allocation:** The distribution of project risks amongst parties to a project. Effective risk allocation requires identification and analysis of all project risks. Risks should be allocated to parties best capable of managing them technically and financially.

**Risk Mitigation:** Plans and measures taken to manage and reduce risks.

**Roles Analysis:** Analysis of all the functions involved in developing and implementing a project and how these roles should be distributed consistent with the business objectives and capacities of all parties to a project.

**Security:** Tangible (physical) property, contractual assets, intangible property, cash or other financial instruments which a lender can use or sell in event of default by a borrower under a loan agreement in order to recover unpaid principal outstanding on the loan at the time of default.

**Senior Debt:** Debt which has a first or senior priority position to be repaid first from funds available for debt service.

**Sensitivity Analysis:** A second order of project financial analysis which tests the impact on key financial results (e.g., debt service coverage ratio) given changes in key project variables such as particularly fuel prices, electricity and thermal output sales prices, fuel and electricity price relationships, operating costs, and financial structure variables including debt interest rate and term and debt/equity ratio. Sensitivity analysis is used to confirm the integrity of a project to meet its debt service obligations in the reasonable range of scenarios.

**Simple Payback Period (SPP):** A measure indicating the number of years it takes for an EE project/investment to return its initial costs in the form of savings. It is the simple ratio of (A) project capital costs to (B) first year savings. SPP is an easy shorthand measure of economic viability.

**Sources of Funds:** A schedule defining where funds will come from to pay for a project’s capital costs, e.g., senior debt, subordinated debt, equity, grants, end-user down payment, etc.
Special Purpose Corporation: A new corporation formed to be the owner and borrower for a new project, often used in project financing.

Subordinated Debt: Debt which has a secondary priority position to be repaid, after senior debt and after other obligations which may be defined.

Term Sheet: A summary of key terms for a loan or equity investment, usually presented by the lender or investor, or requested by the prospective borrower or investee, as a step toward reaching full agreement on a loan or investment.

Transaction Costs: Costs for preparing a loan (or investment) incurred up to the point of loan/investment closing usually for project development, lender due diligence, and preparation of loan and related legal documents. EE projects typically have very high transaction costs relative to their size.

Trial Close: A term used in selling referring to interim agreements which a seller seeks from a buyer as a means to qualify the customer, build the relationship and confirm the intent of the purchaser to ultimately buy the product or service being offered.

Turnkey Construction: Commitment of a single party, a contractor, to completely construct and install a project on time, on budget and according to specifications.

Uses of Funds: A schedule defining the complete breakdown of how project funds will be spent.

Valuation: A dollar amount, and the process and calculation methodology for arriving at the dollar amount, that a company, project or asset is worth. Valuation can be based on historic and future financial performance of the company or project, funds that can be realized from liquidation and sale of assets net of liabilities, and other methodologies.

Vendor Finance Program: A programmatic relationship between an equipment marketer, or “vendor”, and a bank or leasing company designed to support the vendor’s equipment marketing and provide financing to the customer at the point of sale.