



COMMUNICATING THE “FINANCEABILITY” OF ENERGY EFFICIENCY PROJECTS (EEPs): GUIDE TO DATA NEEDS FOR FINANCING EEPs IN CHINA

XIAOYU SHI, THOMAS K. DREESSEN, ALEXANDER PERERA

EXECUTIVE SUMMARY

The purpose of this guide (Guide) is to help industrial companies (Hosts) finance energy efficiency projects (EEPs) at their facilities as defined in Annex C of this document. The Guide is designed to help Hosts know what information is required of them by financing entities (Financiers) to streamline the evaluation and financing process. This Guide can also help financial institutions, energy services companies (ESCOs), vendors, and other project developers better understand the information required to finance EEPs. The Guide draws from the authors’ experiences and insights gained through extensive work with Hosts, Financiers, ESCOs, prestigious universities such as Shanghai Jiaotong University (SJTU), and other stakeholders in the financing of EEPs. It was developed in partnership with Chinese and global Financiers and energy efficiency experts.

Findings indicate that Hosts can accelerate and enhance the financing process and likelihood of success in three ways:

1. Communicating with Financiers as early as possible to understand their informational or structural needs, their financing decision-making criteria and processes, as well as any special services that the Financiers provide (i.e., technical assistance in designing EEPs).
2. Performing a “self-screening” assessment of any proposed EEPs that many Financiers would evaluate, such as type of Host or technology, size of project, and so on.
3. Providing as much detailed and accurate information as possible at the beginning of the financing process since plentiful data will increase credibility with Financiers.

CONTENTS

Executive Summary.....	1
Overview.....	2
Prescreening.....	3
Host Assessment.....	3
Project-Level Assessment.....	5
Financing Decision and Financial Closure.....	13
Conclusion.....	14
Appendix A: EEP Assessment Indicators.....	15
Appendix B: Explaining the 5 Cs.....	15
Appendix C: Top 10 Key Projects for Energy Saving.....	17
Appendix D: Chinese Government Fiscal Incentives for EEPs.....	17
Appendix E: List of Typical Bank-Acceptable Collaterals.....	18

Disclaimer: Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback and to influence ongoing debate on emerging issues. Most working papers are eventually published in another form and their content may be revised.

Suggested Citation: Shi, X., T. K. Dreessen, and A. Perera. 2012. “Communicating the ‘Financeability’ of Energy Efficiency Projects (EEPs): Guide to Data Needs For Financing EEPs in China”. Working Paper. Washington, DC: World Resources Institute. Available online at <http://wri.org/publication/data-needs-financing-energy-efficiency-projects-china>.

Hosts often experience delays and rejection of EEP financing because Financiers were not provided critical Host and project data in a timely and accurate manner. This has prevented Financiers from receiving a compelling picture of the benefits and (limited) risks of a promising EEP. Being prepared to present the correct data to Financiers results in a smoother financing process and a much higher probability of success.

This Guide is designed to:

- familiarize Hosts with the type of data most Financiers use to evaluate EEPs, as set forth in Annex A: EEP Assessment Indicators, and explain why the data are important;
- explain the general indicators used by Financiers to evaluate Host and project attractiveness and why these indicators are used;
- explain what information is important during the different stages of the financing process;
- help a Host conduct its own assessment of its EEP prior to submitting an application to prospective Financiers, to help improve the quality of the financing application and likelihood of success;
- highlight common mistakes Hosts make when seeking energy efficiency financing, and
- illustrate the impact different financing mechanisms have on a Financier’s evaluation and requirements of the Host and the EEP.

By using this Guide to become more familiar with the financing process for EEPs, Hosts can improve their success rate in securing attractive external financing to increase their facilities’ energy efficiency.

OVERVIEW

The need for good data collection in energy efficiency projects (EEPs)

A good understanding of the indicators that Financiers use in evaluating and screening an EEP plays an important role in helping a Host secure commercially attractive external funding for its projects. Even if project economics are good, it is important that Hosts, ESCOs, and other project developers provide Financiers with the clear and high-quality information and documentation they need to clearly evaluate all the benefits and risks. The earlier in the project development process a Host can provide this information, the quicker the evaluation and financing process can be. These strategies can help Hosts secure external financing for their EEPs when internal capital is expensive or unavailable.

Understanding the financing process

The major stages that Financiers go through before making final investment decisions are illustrated in Figure 1 (although in practice the process is not always as linear). This Guide focuses on how best to improve effectiveness in the first four stages of Host and EEP assessments. The last two stages are not addressed since they are largely driven by each individual Financier’s internal processes, criteria, and decisions.

What is discussed in this Guide

This Guide points out the key performance indicators and characteristics of Hosts and EEPs that Financiers typically evaluate when making financing decisions. The evaluation performed by Financiers is not limited to the EEP itself but in fact starts with an analysis of the Host — the legal entity owning or operating the facility where the EEP is implemented and related savings are generated. The Host is first evaluated because if it were to go out of business, there would be no cash to repay the Financiers, regardless of how

Figure 1 | **Flowchart of steps in evaluating the “financeability” of EEPs**



well the EEP performs, technically and financially. Consequently, Financiers look closely at the Host’s financial history and operating track record to evaluate its creditworthiness and/or ability to provide adequate collateral or other credit enhancements. If the Host is not deemed creditworthy, Financiers will not finance the EEP unless collateral or other forms of credit enhancements are provided by other entities or third parties. Once the Host is approved, the Financier proceeds to the project-level assessment phase, in which Financiers examine several areas of quantitative and qualitative information associated with the EEP to determine its return and assess its risks.

PRESCREENING

The financial assessment of an EEP by Financiers, which includes banks, ESCOs, and investors, typically begins with a prescreening of the Host as well as the EEP to determine if the Financiers’ minimum “threshold” criteria for lending or investing are met. Different types of Financiers have different requirements for lending or investing. For example, one might focus solely on a Host’s assets and ability to repay, while another might also focus on the transaction size and type of technology implemented in the EEP. These “threshold” criteria must be met before a Financier will invest the time to conduct a more in-depth assessment of the Host and its EEP.

For example, according to Mr. Liyong Zhu, manager of the operations department of the Industrial Bank (China), energy efficiency loans are targeted for EEPs that use mature technology, can be easily manipulated, can bring obvious energy savings, and have good economic feasibility, such as coal-fired boiler retrofitting, combined heat and power generation, electric motor energy saving, waste heat recovery, and building efficiency.¹ Thus, before getting deeply involved with any prospective Financiers, it is critical for a Host to check the Financier’s specific eligibility requirements and determine if the Host entity and its proposed EEP meets them.

Once a Host and its EEP meet the Financier’s preliminary eligibility requirements, the Host will be asked to provide additional Host and project information. The scope and quality of this information will determine how long it takes the Financier to complete its evaluation and whether it is willing to continue the process. High-quality information will reduce unnecessary communication and data requests during this critical stage of Host and project-level assessment. A shortened evaluation process and reduced

“back-and-forth” communication will contribute significantly to an accelerated financing process.

As this Guide will repeatedly emphasize, Hosts should involve all potential Financiers in the project development process as early as possible. An exception may be advisable in the case of Chinese banks, with whom Hosts may find it better to start discussions after the government has approved the EEP’s feasibility study report (FSR) and environmental impact assessment (EIA).

Involving Financiers as early as possible shows them a Host’s sincere intention to implement the EEP. It engenders confidence in the technical and financial performance of the EEP and helps Hosts get an early understanding of each Financier’s financing model and specific requirements, thus saving time later in the process. Once prescreening is completed, a more comprehensive and detailed investigation begins, comprised of two distinct types of assessments: one of the Host and the other of the EEP.

HOST ASSESSMENT

A Host should help Financiers understand its financial history and creditworthiness, since this initial evaluation determines whether they will proceed any further. The reason for this is simple: regardless of how well an EEP is expected to perform, if the Host is not creditworthy or not able to remain in business, the EEP investment will not be repaid and thus will present a default risk for Financiers.

Normally, Financiers evaluate an EEP with the same criteria they use for any other type of investment or loan. After a successful initial assessment of a Host, Financiers conduct a more in-depth and comprehensive analysis of the Host’s credit experience, specifically its repayment history of current debt obligations.

The Host assessment is not dramatically different from what a bank would request in determining whether to make a loan to a company for other types of capital projects. The threshold evaluation must be done with supporting financial statements of the Host, which (in most cases) must be audited by credible and qualified external auditors. The Host typically must have at least 3 years of successful operational history and provide audited financial statements for the last 2 fiscal years that reflect a solid financial performance and condition. Generally speaking, a Host assessment examines two aspects: (1) Host financial history and track record and (2) Host creditworthiness.

Host Financial History and Track Record



Financiers first examine the basic operational and financial history of a Host before proceeding to assess its creditworthiness and the viability of the EEP. By reviewing a series of the Host’s historical indicators, together with industry analyses, Financiers expect to understand the Host’s legal compliance, whether its operations are in good shape, whether its position in the industry is stable and reliable, and whether the Host can be expected to remain in business throughout the investment (or loan repayment) period.²

A Host’s financial history and track record should pass the Financiers’ minimum requirements, which differ depending on the Financiers’ specific strategy and experience. This Guide provides the commonly applied minimum requirements suggested by energy efficiency financing experts, which include the following Host financial history indicators listed in Section 1 of Annex A: EEP Assessment Indicators:

- 1.1 The Host has been in operation for more than 3 years.³
- 1.2 The Host’s business license⁴ is valid and within the applicable legal duration.
- 1.3 The nonfinancial record of the Host and its shareholders includes no compromising aspects.⁵

These questions can be answered by “yes” or “no” to help Financiers determine whether a Host is complying with all legal and regulatory requirements and has a reasonable operational history. Investors are unable to assess current energy consumption without a sufficient understanding of a Host’s past operating performance (production or use of facilities). Obviously, a longer history of successful operation is viewed as a sign that the Host will sustain a secure place in the market.

Host Creditworthiness



The Financiers’ credit assessment of the Host is primarily based on responses to the criteria listed in Section 2 of Annex A: EEP Assessment Indicators. This credit assessment process is based on the following five perspectives of Hosts, commonly referred to as the “five Cs.” (See Annex B for more detail)

- **Character:** The Host’s attitude and historical record performing on its payment responsibility; the assessment of client’s character usually relies on past payment records.
- **Capacity:** The Host’s payback ability (both short term and long term), assessed based on financial indicators that include

- liquidity indicators, such as current ratio, quick ratio, receivable turnover, inventory turnover, and
- solvency indicators, such as debt asset ratio, debt-service coverage ratio/times interest earned.
- **Capital:** The Host’s financial or economic capability (net worth or shareholder equity).
- **Collateral:** The assets that can be pledged as collateral when the Host is unable or unwilling to repay the debt. Collateral is important especially when dealing with new clients or ones with controversial credibility (see Annex E: List of Typical Bank-Acceptable Collaterals).

- **Condition:** All external factors that could affect the Host’s repayment capacity, such as the competitiveness of the industry, whether the company is facing a lawsuit, the economic environment, etc.

Among the “five Cs,” “collateral” is particularly challenging for the financing of EEPs because these projects have very limited collateral value: EEPs generally do not involve land purchase, building construction, or patent rights, which could be evaluated by Financiers as having a high collateral value (see Annex E: List of Typical Bank-Acceptable Collaterals). Instead, the cost of EEPs includes high soft and labor costs (~40%) occasioned by the need to remove old equipment, which has very little salvage or collateral value.⁵ Due to the low collateral value of most EEPs, potential Financiers of such projects usually have stricter requirements for Host credibility and creditworthiness, thus requiring Hosts to turn to third parties for collateral or guarantees. A few banks in China are taking a new approach to EEPs that includes accepting the accounts receivables from the energy savings as collateral. A brief overview of this approach is provided in Box 1 below.

In order to more accurately assess Host creditworthiness using the five Cs, all Financiers, regardless of the type of financing they provide, require the Host to provide financial statements audited by a credible third party. Financiers use these statements to determine a Host’s credit capacity as well as to calculate important financial indicators and other key information. Whether or not a Host adequately provides such information indicates to Financiers the Host’s level of confidence in its financial health as well as its commitment to EEPs.

Box 1 | New Approach to Addressing Collateral Challenge for EEPs

Recently, several types of collateral or guarantees acceptable to Financiers for EEPs have emerged as solutions to the “collateral” challenge. In late 2011, Shandong Province and Shanghai Pudong Development Bank (SPDB) collaborated in issuing a loan of 4 million RMB to an ESCO pledged by the accounts receivable from the savings of the related energy performance contract. The Shanghai government is also exploring with Chinese banks a mechanism to use future accounts receivable as pledged collateral in addition to traditional project assets. As a participant in this project, Industrial Bank (China) launched a specific energy performance contracting (EPC) financing product for ESCOs in 2012. The EPC quantifies the energy efficiency benefits and accepts accounts receivable from the related energy savings as pledged collateral.

This model of using accounts receivable by ESCOs as pledged collateral is widely appealing to ESCOs since it fits their service company characteristics, which include limited assets and difficulty in using their balance sheet as guarantee or collateral. The model helps ESCOs increase their financing opportunities and expand their business. It is also beneficial to Hosts as they can use third-party financing more frequently and thus minimize the use of their credit capacity to finance EEPs. Despite these new financial models, Hosts should recognize that banks will likely impose higher requirements (such as collateral) on them than when the loan is guaranteed by an ESCO’s assets. Whether or not the Host collaborates with ESCOs in providing financial information to banks can significantly increase ESCOs’ chances of obtaining EEP loans from banks.

PROJECT-LEVEL ASSESSMENT



After a Financier deems a Host creditworthy, its EEP is examined and evaluated from a risk-and-return perspective. Financiers prefer to fund larger transactions, so when Hosts have several EE opportunities, bundling them into a single large EEP can help attract Financiers. Generally speaking, neither equity investors nor banks are interested in funding transactions of less than about US\$25 million.

Financiers typically require the energy cost savings of EEPs to deliver a good return at an acceptable level of risk. Consequently, this section of the assessment focuses first on project return, then on project risk. External investors, especially ESCOs and private equity investors, give considerable weight to the project-level financial viability in deciding whether their investment can generate enough reliable cash flow to repay their capital investment at the targeted rate of return.

While performing the project-level assessment, Financiers typically start with qualitative data. For example, if large EEPs require governmental approval, Financiers will first confirm if all such approvals have been obtained (i.e., the EIA and FSR). Financiers must confirm that both the EEP and the Host-related equipment are, or will, comply with all legal and regulatory requirements and are not restricted by any government industrial policy. They may also check whether the applied technology is encouraged by the government, whether it is mature, and whether the equipment is made by reputable manufacturers. Such a qualitative assessment is followed by verification of the project's specific financial estimates and assumptions.

With the exception of very large (multimillion-dollar) EE investments, banks traditionally do not focus on the economics of EEPs. Most EE loans are made on the basis of balance-sheet lending to companies with whom the banks have an existing relationship. Banks want to know that the borrower can repay the EEP loan even if estimated energy savings do not materialize. Although bankers are interested to see evidence that an EEP's energy savings will repay the investment, for the vast majority of EEPs, the borrower's creditworthiness is the only real critical factor in the bank's decision.⁷

This situation is changing, however, as commercial banks such as Industrial Bank (China) and Shanghai Pudong Development Bank (SPDB) look at project-level analysis and start to consider in their credit evaluation the savings and the related impact on Hosts' payback prospects. As stated earlier, they are starting to finance receivables from future savings on EEPs for large ESCOs with a long EPC track record and sufficient current operating cash flows to cover the debt service related to new EEPs being financed. Consequently, although these practices are still defined as corporate lending, based primarily on the existing creditworthiness of the ESCO, it does reflect the beginning of cash-flow lending to EEPs by Chinese banks.

A brief explanation of each of the Project Evaluation Criteria typically evaluated by Financiers (listed in full in Section 3 of Annex A: EEP Assessment Indicators) is provided below.

Project Return

3.1 Ensure that the explanation of how the EEP saves energy or fuel is clear and reasonable, including detailed estimates.

The most important thing for a Financier to understand is how the EEP will operate and deliver savings. This explanation should highlight those technologies in the EEP that are 'proven' and those encouraged by the government (as detailed in Annex C: Top 10 Key Projects for Energy Saving). The Host should also document any required governmental or regulatory approvals or licenses that it has obtained for project execution, and explain the process and timing to obtain any outstanding ones.

The project description and explanation of the energy savings provided by the Host must enable Financiers to determine whether the project can save energy, how much energy it can reasonably save, and whether the savings can be measured and verified after installation. The amount of energy savings to be achieved is the most significant factor for Financiers, especially ESCOs, in determining whether the EEP investment can provide their targeted profit returns. Before they invest in an EEP, Financiers must be comfortable with the estimated energy savings and be able to calculate them from the information provided by the Host.

Clearly explaining how each EEP generates energy savings is not as easy as it seems. It requires specific energy efficiency (EE) technical knowledge and experience. To enable the Financier to better understand the project, the Host should describe in detail the qualifications of any design institute (or ESCO), the technical review process, and the technology provider's track record.

To assist the Host in properly explaining the energy savings, several questions about the EEP are listed below which should be answered in a way that enables Financiers, or any third party, to verify the savings estimates and be assured that the project will perform as designed.

- **Project boundary:** What energy consumption equipment and systems are to be retrofitted?
- **Energy-saving technology and system:** For example, in a lighting retrofitting, will LEDs be used, or will the natural lighting also be considered? In a boiler energy efficiency upgrade, will the low efficiency boiler be replaced by a new high efficiency boiler, or will the overall efficiency improvement be achieved by modifying the condensate water recycling system of an existing boiler?

- **Technology commercialization:** Has the technology been implemented and successfully operating for the intended financing period? Is the technology included in the National Key Energy Efficient Technologies Promotion Catalogue (first batch to the fourth batch)?⁸
- **Baseline:**
 - Before retrofitting, what are the current energy consumption parameters (e.g., fuel type and efficiency indicator) and operation status (e.g., operation hours and period) of the equipment to be retrofitted as well as the associated equipment (e.g., variable speed drives [VSDs] and associated motors on which VSDs are to be installed)?⁹
 - After retrofitting, what are the energy consumption parameters and the operating status of the retrofitted equipment, as well the related equipment affecting energy consumption of the overall system?
 - Which models and formula are used to arrive at the energy use baseline to determine the amount of energy saved? Hosts should provide detailed calculation spreadsheets as attachment for Financiers, or their hired experts, to validate.
- **External conditions:** What conditions could affect energy use, such as ambient temperature or operating conditions and production volumes, and to what extent would these conditions change energy use? (This is important because the performance of many EEPs is related to a process or system.)
- **Assessment of savings:** Which equipment and what indicators are monitored to assess the energy savings, for example, the amount of steam saved? What methodology is to be used? What are the key assumptions made in arriving at the amounts? What are the major factors that could affect energy savings (e.g., energy prices and operation level of equipment) and to what extent will they affect energy savings expressed in monetary rather than technical terms? How much energy is estimated to be saved annually and for what duration of time? What factors affect the dramatic seasonal fluctuation of energy use and estimated energy savings, if any?
- **M&V:** How will the energy savings be measured and verified after installation?

3.2 Ensure that annual energy cost savings are reasonably estimated, providing a current energy tariff schedule and the expected trend in coming years.

A conservative approach should be taken in determining the energy prices used in estimating the savings. The use of the current tariff schedule and the cost of each type of energy saved (coal, electricity, fuel oil, gas, etc.) is critical to properly estimating the monetary savings. At the very early concept stage of project development for initial screening by Financiers, it is usually acceptable to use average pricing estimates that ignore the true rate schedules and periodic fluctuations of fuel prices that are immaterial to approximating the annual energy cost savings. However, when the EEP proceeds into the later phase of project development and formal evaluation stage, Financiers will require a much more precise energy-savings estimate. This requires using actual rate structures and operating conditions that account for periodic fluctuations to calculate the energy cost savings based on current rates and plus reasonable inflation assumptions. Financiers always prefer an estimate that uses actual tariff structures as early as possible.

3.3 What is the Host’s total annual energy consumption of all major utilities and their related costs for the most recent year? If possible, please give the annual average for the past 3 years. If available, provide previously-prepared energy audit reports of the Host site.

Understanding the historical annual energy consumption and associated costs of the specific Host site where the EEP is to be installed is important to assessing the EEP’s estimated energy savings and whether or not these are attainable.

By comparing the EEP’s estimated energy savings to the overall energy consumption and costs of the Host site, Financiers can further confirm the reasonableness of the savings estimate for the proposed EEP. For example, many hospitals in less developed countries have very inefficient equipment, and replacing it with more energy efficient alternatives would appear to deliver a very high level of savings. However, if the equipment is not operated often (e.g., if the air conditioning is not turned on most of the time during the summer), very little savings will in fact be realized. This reinforces the importance of using the actual operating status of energy-consuming equipment in the energy-savings calculations. It will help avoid significantly overstating the estimated savings (to the point where in some cases savings have been estimated (incorrectly) to equal or exceed the site’s total annual energy costs).

Experienced EE Financiers can sometimes determine if the Host has potential energy savings beyond the proposed EEP by comparing the Host site's overall annual energy consumption and costs to industry benchmark data. Detailed energy consumption and cost information can sometimes be obtained, for example, via energy audit reports generated according to Chinese standards, but the information needs to be combined with unit energy consumption, the applicable utility/fuel cost structure applicable to the particular site in order to provide sufficient data for Financiers to create the "before" EEP energy consumption and costs (baseline), which is compared to the "after" EEP consumption and costs to calculate the savings realized from the EEP.

By examining energy consumption and costs over multiple years, Financiers can look for signs of unstable operations or energy use of the Host. Declining energy use accompanied by declining sales shown in financial statements alerts Financiers to a potential long-term Host sustainability risk. They would want to determine if the declining trend of operations will continue or improve during the period of time when the proposed EEP is expected to repay them from generated energy savings. Financiers would also take a closer look at the claimed energy savings to see how they would be impacted by declining operations.

3.4 By what percentage will total annual energy costs be reduced from the proposed EEP?

This information is important to again assess the reasonableness of estimated savings. For some facilities, there is a "rule of thumb" estimate of what is a reasonable level of savings that can be achieved. In a commercial building, for example, regardless of the kinds of EE technologies the project applies, the estimated annual energy savings generally do not exceed 25 percent of the sum of a Host's total energy bills. For industrial sites, there is no such estimation of total energy bills due to the number of variables in the operating conditions (number of shifts) and the systems affected by the EEP.

3.5 What other estimated benefits of the proposed EEP does the Host think are important? For those that can be quantified in monetary terms, please show values and the basis for the estimates.

Potential benefits to the Hosts beyond energy savings may include a variety of factors, such as reduced cost of maintenance, lower labor or other materials, and improved production quality or yield. By understanding the benefits

beyond energy savings, prospective Financiers can better understand the additional non-energy value of implementing the EEP for the Host that can sometimes exceed the value of the energy savings and result in reduced risk for the Financiers. Even though some of the benefits cannot be quantified in monetary values, Financiers would like to fully understand all the benefits and motivations of the Host to implement the proposed EEP.

3.6 Does the EEP fall into one of the PRC's 10 Energy-Savings Project categories and other categories promoted by the central and/or local governments?

This is needed to clarify whether the proposed EEP can qualify for governmental incentives, including fiscal support to support capital cost and tax exemption. During the 11th Five Year Plan period, the Chinese governments launched various incentive programs such as subsidies, cash rewards, and tax credits for the development and implementation of EEPs that vary from region to region but have the consistent eligibility requirement of being one of the PRC's 10 energy-savings categories (see Annex C: Top 10 Key Projects for Energy Saving). When soliciting EEP financing that incorporate the financial benefits from the PRC incentive programs, the Host needs to document eligibility for such programs.

China is now midway through the 12th Five Year Plan period, and many of the fiscal incentive policies are expected to remain effective through its ending in 2015. See Annex D: Chinese Government Fiscal Incentives for EEPs for a description of these incentive policies.

3.7 What are the breakouts of the total project capital estimates of the EEP? What is the basis for each cost estimate?

In order to determine the rationale and reasonableness of the proposed investment, a Financier must see a detailed breakout and explanation of the capital costs to engineer, procure, and construct the EEP. Hosts can hire an EEP-experienced third party consultant, developer, design institute or ESCO to cross-check or survey EEPs using similar technologies and thus determine whether the project's choice of technology and the corresponding investment cost are appropriate.¹⁰ The credentials of any such qualified third party should be provided by the Host to Financiers.

Banks want to ensure that equity is being invested and that they are not lending more than around 70 percent¹¹ of the true out-of-pocket costs of implementing the EEP. This element of risk control is a critical requirement for

banks. Consequently, the project cost information must be backed up by bids or proposals from third-party (independent) contractors and vendors who would be the likely entities to implement all or portions of the EEP. At early stages in the project development, a Host may not have such bids or proposals available. To fill this information void and justify the cost estimates of the proposed project in the preliminary phase, the Host can use a reference case where similar EE technologies in the same or similar sector have been applied successfully. Appropriate adjustments are often needed, and the rationale and methods used in the adjustments need to be stated.

While examining the breakdown of upfront project capital cost estimates, Financiers look to see if there are any key costs that may have been overlooked and whether any cost estimates are abnormally high or low. Unsurprisingly, Financiers pay more attention to cost items for large EEPs than for small ones.

Since EPC projects implemented by ESCOs are turnkey projects, the accuracy of the project cost estimates is very important to Financiers. The final cost estimates should be as accurate as possible, with a fluctuation of not more than 5 percent. Once the cost of the project is determined, there will be less room for further negotiation. If the EPC project involves equipment of high value or subcontract projects, relevant contracts or invoices should be provided.

3.8 What are the unleveraged (debt-free) project net present value (NPV) and internal rate of return (IRR)? Show detailed calculations. If you have not done a cash flow analysis or an NPV and IRR calculation, please provide the simple payback period. Be as comprehensive as possible when calculating operational costs of projects, including labor, materials, and financing costs.

The IRR and simple payback period are the major financial criteria looked at by equity investors and other Financiers in assessing a project’s return. Compared with the simple payback period (SPB) calculation (total project capital costs divided by estimated annual savings), the IRR is a more accurate method of measuring the return on an investment, since it takes into account the timing of cash disbursements and receipts over the life of the investment.

In the early development stages of an EEP, a Host often does not have sufficient data to prepare the long-term cash flow needed for an accurate IRR and NPV calculation. Items needed for cash-flow analysis include the design/

build capital costs for the EEP, timing for construction payments, expected operating and maintenance costs over the estimated useful life of the related equipment, taxes, incentive funds, and assumed inflation rates. It takes time for EE technical and financing experts to accurately provide estimates of all these items. Consequently, an SPB calculation is often used to provide a very rough and preliminary estimate of the project’s rate of return to determine the need to calculate the detailed IRR and assess if the EEP is a viable investment opportunity.

The normal SPB of EEPs in China at industrial sites is around 3 years, and third-party equity investors typically require a minimum IRR of around 15 percent on the unlevered capital invested. A sample cash flow of such an IRR calculation is shown in Table 1.

The return requirement by third-party equity investors, compared to the cost of internal capital of Hosts, may appear to be too high for Hosts. However, Hosts should focus more on the value the EEPs generate without requiring any of their internal core business capital or lending capacity instead of the single figure of cost of capital. They also should understand that equity is certainly more expensive than debt and should cost more than a Host’s internal cost of capital when investors are accepting savings as their primary form of repayment. The value of the EEPs for Hosts is mainly the cost savings they realize after deducting the amount due to Financiers. This value is determined by calculating the unleveraged NPV of the EEP for the net cash to be realized over the useful life of the installed equipment, which far exceeds the investment or debt repayment terms. Hosts should note the opportunity value presented by third-party financing especially when without it, implementing the EEP may be challenging or not possible, given the difficulty of obtaining internal capital.

It is important to present detailed calculations of NPV, IRR, or SPB. Financiers would also like to have details on primary factors affecting the return of EEPs, such as the rate structure of fuel and electricity, so that they can evaluate whether the project return data provided by the Host are conservative or optimistic. By knowing how the cash flow analysis is done and which key factors affecting return are included, Financiers can accelerate their detailed cash-flow risk analysis. These details enable Financiers to generally determine whether the provided return is sufficient and whether the data are realistic and accurate.

Table 1 | **Investor EEP Pro Forma RMB (000s)**

PROJECT FINANCED AMOUNT		ASSUMPTIONS	
EPC Contractor Capital Costs	60,000	Simple Payback - Years	3.0
Legal Third Party Due Diligence Costs	1,800	Construction Period - Months	12
Project Capital Costs	61,800	Investor Repayment Term - Yrs.	6
Interest during Construction	2,781	Construction Interest Rate to Financier	9.0%
Total Project Financed Amount	64,581	Annual Inflation Rate	0%

CONSTRUCT PERIOD	1	2	3	4	5	6	TOTAL
Host Payments	21,244	21,244	21,244	21,244	21,244	21,244	127,463
Labor, O&M, and M&V Cost	(1,800)	(1,800)	(1,800)	(1,800)	(1,800)	(1,800)	(10,800)
Project Insurance	(300)	(300)	(300)	(300)	(300)	(300)	(1,800)
Depreciation Expense - Years	(10,764)	(10,764)	(10,764)	(10,764)	(10,764)	(10,764)	(64,581)
Earnings before Taxes (EBT)	8,380	8,380	8,380	8,380	8,380	8,380	50,282
Income Taxes (0 Yrs 1-3; 50% Yrs 4-5)	(2,095)	(2,095)	(2,095)	(2,095)	(2,095)	(2,095)	(12,570)
Net Profit	6,285	6,285	6,285	6,285	6,285	6,285	37,711
Depreciation Expense	10,764	10,764	10,764	10,764	10,764	10,764	64,581
Investor IRR and Cash Flow 15.0% (64,581)	17,049	17,049	17,049	17,049	17,049	17,049	102,292

Project Risk

This section discusses what information is needed to evaluate project risk as listed in “Section 4 of Annex A: EEP Assessment Indicators”. A major area that can reduce project risk for Financiers and should be a consideration to be addressed is what kinds of security¹² the project can provide for external financing, and what kinds of measures the Host is planning to undertake to mitigate related

risks. Banks pay a lot of attention to the quality of security being provided in case their loans are not repaid. If an EEP investment return is excellent and its risk quite low, Hosts may negotiate with banks to expand the category of acceptable collateral to include savings from the EEP. To mitigate the bank’s risk concern, an escrow account¹³ can be set up at the lending bank from which repayment of the related bank loan are made.

4.1 Present evidence that the proposed energy-saving technology has a proven track record of successful commercial applications over last 3–5 years (please provide a list of successful applications or other supporting documentation, such as energy-saving technology promotion lists and case books published by national or subnational agencies that include the proposed technology).

Many mature (proven) and commercialized EE technologies are available in China to help Host companies save energy. In order to avoid unnecessary technical and related project performance risks, external investors usually do not fund EEPs that do not utilize proven technologies. EEPs using immature or non-commercialized technologies should pursue other noncommercial channels, such as government funds, for technology R&D or piloting. A Host should provide evidence that the proposed energy-saving technology has a proven track record with successful commercial applications over the last 3–5 years and be able to list other applications where it has been successful. Collections of practical energy-saving cases compiled by municipal, provincial, or even regional organizations — such as the Economic and Information Commission of Minhang District, Shanghai — are excellent sources for case application.

4.2 Did you use an auditor for project identification and if so, who? Please describe the auditor’s credibility (membership in professional associations, international recognition, awards, past experience, etc.).

The use of experienced and qualified professional energy efficiency auditors, third party consultants or developers for project identification and technical design will increase the quality of EEPs and reduce external investors’ concerns about the estimated savings, technical design, and capital costs.

4.3 What is the percentage of the EEP’s total capital cost to the Host’s corporate net worth?

In order to control risks, Financiers normally require that the total capital cost of the EEP be no more than 10 percent of the Host’s net worth reflected on its audited balance sheet. Banks and other institutions specialized in financing EEPs with Hosts that are small and medium-sized enterprises (SMEs) may lower this requirement if additional collateral, third-party guarantees, or other credit enhancements are provided.

4.4 What is the upfront equity contribution or debt leverage?

Banks and other lenders generally require an equity investment from the Host or other project sponsor of at least 30 percent of the total capital cost of the EEP (ESCOs are supposed to provide a higher percentage of equity investment). Higher levels of equity investment by the Host improve the likelihood of funding from Financiers, to whom this indicates greater confidence in and commitment to the EEP. The Host will need to clearly document any equity instrument it has made in the EEP if it wants it to be considered by Financiers.

Equity investors are also concerned about the finance structure and the debt amount required to finance the EEP because their return and risk can be heavily affected by the cost and ratio of debt to their equity investment. For equity investors, the higher the amount of debt used to finance the EEP, the higher the repayment risk, since bondholders are repaid before equity investors, but conversely the higher IRR on equity. The finance structure of the project should therefore be considered during financial analysis and its impact on the IRR determined.

4.5 If you have selected an ESCO partner to help design and implement the proposed EEP (or an ESCO partner is completing this survey), please provide information on their (your) credibility, experience, and performance, including that of energy performance contracting.

ESCOs are enterprises specialized in providing Hosts with both technical and financial professional and performance-based EE services. Partnering with credible and eligible ESCOs can substantially reduce technical and financial risks for the Host and Financiers. As the EEP’s designer and implementer, an ESCO’s past experiences with similar EEPs, as well as the actual energy savings achieved, are key considerations for Financiers evaluating its capabilities. Financiers like to see Hosts hire ESCOs with extensive experience in implemented EEPs similar to the one proposed and with a record of success achieving energy savings at similar levels. The more an ESCO’s related experience and the better its track record in achieving energy savings, the lower the risks Financiers will perceive.

Selecting the right ESCO is very important for the success of the EEP. Although China’s ESCO industry has grown dramatically in the past few years, many of these companies are newly established, small, and have limited EPC experience. The credibility and track record of one ESCO

could differ dramatically from those of others. A Host seeking an ESCO can get useful information or help from ESCO programs that national and local governments have established. One typical such program is the public listing of ESCOs registered with the National Development and Reform Commission (NDRC) and Ministry of Finance (MOF)¹⁴ or recommended by the Ministry of Industry Information and Technology (MIIT).¹⁵

Hosts can also seek qualified ESCOs by contacting other nongovernment programs, such as the New Ventures China program (which was founded by WRI). Collaborating with DAO Institute for Environment and Development in China, New Ventures China helps selective ESCOs and other SMEs obtain financing, enhance their capacity, and grow their businesses strategically. Many ESCOs in this program have a long history of EPC business and good track records.

While the final two items below might not seem as critical at the preliminary screening stage as the ones above, we highly recommend that the Host answer them for investors and financial institutions, since this will support the project's credibility.

4.6 If there is a plan for measuring and verifying energy savings, please describe the plan, specifying which protocol or standards or guidelines you used in developing it and whether you expect to use an independent third party to conduct measurement and verification (M&V).

An M&V plan is critical for EEPs that involve energy performance contracting and require external financing that relies on savings for any portion of repayment. An M&V plan helps ensure that energy savings are measurable, reportable, and verifiable and can resolve disagreements between the ESCO and Host about realized energy savings after the EEP is implemented and commissioned. Many banks, Hosts, ESCOs and their association, the Energy Management Company Association (EMCA), and other third-party service providers, such as companies like SGS-CSTC Standards Technical Services Co., Ltd, advocate the wide use of M&V plans developed based on credible standards for energy performance contracts and external financing.

A new national Chinese standard for M&V of energy savings, the General Technical Rules for Measurement and Verification of Energy Savings, will soon take effect.¹⁶ The International Performance Measurement and Verification Protocol (IMPVP) are becoming recognized in China through its recent program with the Chinese National Institute of Standardization. There are other M&V protocols or standards like the 2008 USA Federal Energy Management Program M&V Guidelines which are not applicable in China. From the perspective of Financiers, a Host that has an M&V plan for its EEPs in China is likely to be knowledgeable and sensible about critical risk management associated with EEPs, especially when an EPC is involved or Financiers expect to be repaid based on the performance of the EEPs they finance.

Many disputes around EEPs have occurred because at the contracting stage (and prior to implementation) ESCOs did not agree with the Host ahead of time on an M&V method to calculate the energy saved. After the project is commissioned, such an agreed and transparent method should become the basis for determining how much energy is actually saved and what the amount of savings-based payments will be. Similarly, when an ESCO is the borrower on a loan, the bank does not want to see that the ESCO's repayment could be affected by disputes between the Host and the ESCO about energy savings. Even when the Host is the borrower and an ESCO provides EE services and guarantees energy savings, Financiers do not want to see any disagreement over achieved savings, since this could affect the Host's repayment of the loan. Since Financiers normally do not have M&V professionals on staff, they typically prefer that an independent and experienced third party to evaluate and perform the M&V. In that case, the qualifications of the independent M&V third party should also be briefly stated in the plan.

Detailed M&V plans are normally not developed until later in the project's development, during the final investment-grade audit (IGA) phase. From the onset, Financiers would like to know that the Host plans to develop such a plan based on credible, transparent standards and that the plan will be developed by a credible entity. Even without a detailed M&V plan, the Host needs to inform Financiers of its plan to create one, explaining the specific M&V plan it will follow to measure and verify savings, and identifying the entity that will develop the plan.

4.7 Has a feasibility study¹⁷ for the EPP been prepared? If so, please provide it, giving the name of the institution that prepared the study and evidence of the institution’s credibility.

Financiers want to see that the technical and financial project information provided by the Host is either from or well supported by robust studies supported by reasonable analyses. As part of their strategy for managing project risks, Financiers also want evidence of the preparing institution’s credibility and experience, especially when Financiers do not have experience with the particular technology the EEP applies to or the sector the company is in. A study developed by a credible institution can help boost Financiers’ comfort with the proposed EEP.

Feasibility studies and IGAs may not be needed for small-scale projects. However, EEPs larger than 10 million RMB typically must have feasibility studies completed before any detailed financial arrangements are discussed and the financial closures reached. The IGA provides investors with all the critical information needed to evaluate a project’s technical and economic feasibility and is the foundation for a successful EEP. A detailed document that validates all estimated savings and costs for each measure to be implemented, the IGA includes the related savings calculation and M&V methodology to be followed by the

Host in making its savings payments to an investor.

An IGA should minimally include:

- complete description of the project design, equipment, and responsibilities of all major parties, including the Hosts, contractors, vendors, and/or other types of implementing entities;
- detailed calculations and assumptions supporting estimated savings as well as design/build and any other operating costs (this must include contractor/vendor cost quotes and contract terms);
- detailed energy baseline calculations for each impacted fuel/utility and reconciliation of estimated savings for each measure in the EEP to the Host’s current energy consumption and costs; and
- detailed savings calculation methodology for Host payments and the related M&V plan.

At the later stage of project development, banks or other investors will also examine other factors such as the reputation of equipment suppliers as part of their risk-control process.

FINANCING DECISION AND FINANCIAL CLOSURE



This Guide does not discuss the last two stages of securing a financing decision and reaching financial closure since these stages are largely driven by each individual Finan-

ciers’ internal processes, criteria, and decisions. However, using this Guide to bring timely information to earlier stages of the process will likely improve these last two steps.

CONCLUSION

The Guide attempts to address the information gap between the Financiers and Hosts seeking to finance and implement EEPs. It is designed to help the Host understand the informational needs of Financiers, not only what is needed but also why.

Hosts that understand the information Financiers require for a financing decision, and why they require it, can better prepare the data needed. Providing organized data for the indicators described herein can help Hosts smooth and accelerate the financing process for their EEPs, improving the prospect and success rate of securing external financing. With a good understanding of the information requirements of Financiers, Hosts, ESCOs and other developers can improve their energy audit process with improved data collection and results to seek financing for EEPs.

WRI hopes this Guide provides a starting point for more productive conversations between banks, project investors, and Host companies trying to finance and implement EEPs. WRI also hopes this Guide can help them determine what types of project and company data need to be collected during energy audits such as those conducted by the University Alliance, a consortium of energy auditors conducting 10,000 energy audits at industrial facilities in China. Lastly, since energy audits in China are required to follow specific provincial or municipal requirements on what data needs to be collected, this Guide can facilitate the updating of energy audit standards and regulations at the municipal and provincial level in China. By better connecting the energy audit process with the data needs of EEP Financiers, this Guide hopes to support an increase in financing activity for energy efficiency improvements in China's industrial sector.

ABBREVIATIONS AND ACRONYMS

AFS	audited financial statement
CBRC	China Banking Regulatory Commission
EE	energy efficiency
EEP	energy efficiency project
EIA	environmental impact assessment
EMCA	Energy Management Company Association
EPC	energy performance contracting
ESCO	energy services company
FI	financial institution
FSR	feasibility study report
IBC	Industrial Bank (China)
IFI	international financial institution
IGA	investment-grade audit
IMPVP	International Performance Measurement and Verification Protocol
IRR	internal rate of return
M&V	measurement and verification
MIIT	Ministry of Industry and Information Technology
MOF	Ministry of Finance
NDA	nondisclosure agreement
NDRC	National Development and Reform Commission (China)
NPV	net present value
SJTU	Shanghai Jiaotong University
SMEs	sSmall and mMedium-s Sized eEnterprises
SPB	simple payback period
SPDB	Shanghai Pudong Development Bank

ANNEX A: EEP ASSESSMENT INDICATORS

1. Host Credibility

- 1.1. Has the Host operated for more than 3 years?
- 1.2. Are the Host's license and renewal records valid and within the legal duration?
- 1.3. Does the Host, or does any of its shareholders, have a negative record in nonfinancial aspects (e.g., violations of environmental regulations, criminal convictions)?

2. Host Creditworthiness (see Annex B for more detail)

- 2.1. Do the Host's payment records reflect any significant overdue taxes?
- 2.2. Has the Host ever been in default on a debt or other major financial obligation? If so, under what circumstances?
- 2.3. Can the Host provide audited financial statements (AFSs) for the past 2 or 3 years?
- 2.4. What is the Host's current ratio?
- 2.5. What is the Host's debt/equity ratio?
- 2.6. What is the Host's debt-service coverage ratio?
- 2.7. Does the Host have a positive net worth and has it been profitable for at least the past 2 years?
- 2.8. What is the Host's collateral or guarantees status? Any evaluation reports?
- 2.9. Does the Host's business appear stable and is it not in an industry eliminated or restricted by the PRC government?

3. Project Evaluation Criteria Return

- 3.1. Is the explanation of the EEP and how it generates energy savings clear and reasonable? Please provide the EEP's estimated energy or fuel savings.
- 3.2. Are the annual fuel cost savings reasonably estimated? Please provide the current fuel tariffs schedule and expected trend in the coming years.
- 3.3. What is the Host's total annual energy consumption of all major utilities and their related costs for the most recent year? If available, please provide the annual average for the past 3 years.
- 3.4. By what percent will total annual energy cost be reduced by the proposed EEP?
- 3.5. What other potential benefits does the Host believe will result from the proposed EEP? For those that can be quantified in monetary terms, please show values and the basis for the estimates.
- 3.6. Does the EEP fall within one of the PRC's 10 energy-savings categories or other categories promoted by the central and/or local governments?
- 3.7. What are the breakouts of the EEP's total project capital estimates? What is the basis for each cost estimate?
- 3.8. What are the unleveraged project NPV and IRR? Please show detailed calculations. If you have not done a cash-flow analysis and thus NPV and IRR calculations, provide the simple payback period.

4. Project Evaluation Criteria Risk

- 4.1. Does the proposed energy-savings technology have a track record of successful commercial applications during the past 3–5 years? Please document, listing any other successful applications.
- 4.2. Did you use an auditor for project identification and if so, which one? Please show the auditor's credibility by identifying membership in professional associations, international recognition, awards, past experience, and so on.
- 4.3. What percent is the EEP's total capital cost of the Host's corporate net worth?
- 4.4. What are the upfront equity contributions or debt leverage?
- 4.5. Have you have selected an ESCO partner to help design and implement the proposed EEP? If so, please document the ESCO's credibility, experience, and performance, including in energy performance contracting.
- 4.6. Do you have a plan for measuring and verifying the savings? If so, please describe, specifying which protocol or standards or guidelines you used in developing the plan and whether you plan to use an independent third party to conduct M&V.
- 4.7. Have you prepared a preliminary energy audit, a solutions study (optional), a feasibility study, a basic design, detailed engineering, or an investment-grade audit for the EEP? If so, please provide it, giving the name and documenting the credibility of the institution that prepared the study.

ANNEX B: EXPLAINING THE 5 Cs

Annex B explains the Section 2 items listed in Annex A within each of the “Five C” categories.

Character

2.1 Do the Host's payment records reflect any significant overdue taxes?

Tax payment records can reveal the overall payment willingness of the company and whether it meets all of its financial responsibilities.

2.2 Has the Host ever been in default on a debt or other major financial obligation? If so, under what circumstances?

Similar to the tax payments, this indicator can be used to assess the Host's performance in meeting its financial responsibilities. Although investors do not like to see defaults, they may allow reasonable and temporary ones. Therefore, Hosts will need to provide prospective Financiers with a good explanation of any prior defaults. Banks can also check the credit record of the Host and its major shareholders by consulting the People's Bank of China Credit Reference Center.

Capacity

2.3 Can the Host provide audited financial statements (AFSs) for the past 2 or 3 years?

All Financiers require Hosts to provide AFSs for the past 2 years and some for the past 3 years. Without Host financial statements audited by a credible independent auditing company, prospective Financiers cannot determine whether the Host's financial health is sufficient to merit financing of the proposed EEP. During the early phase of the Host's funding application, some potential Financiers may not ask the Host to provide audited financial statements. Providing them up front, however, is an easy way to increase a Financier's confidence. Either way, presenting financial statements is one of the minimum requirements, especially before any final financing decision is made.

Many domestic Hosts worry about disclosing financial information to Financiers, fearing that the latter will leak this information to third parties, especially their competitors. To ease such concerns, mature ESCOs agree to include confidentiality provisions in nondisclosure agreements (NDAs) to increase a Host's confidence and cooperation. In NDAs, Financiers promise that financial and other information provided by the Host will only be used within EEP financial transactions and that it will not be disclosed to others.

Liquidity and Solvency

The repayment capacity is key to Financiers' evaluation of the risks of investing in the Host. This evaluation is performed by examining liquidity and solvency indicators. Investors often focus on the following key criteria.

2.4 What is the Host's current ratio?

2.5 What is the Host's debt/equity ratio?

A China project of the Asian Development Bank requires Host companies to have a debt to equity ratio of less than 0.75 to be eligible for their loans; other investors and financial institutions may increase the threshold to 1.

2.6 What is the Host's debt-service coverage ratio?

The debt-service coverage ratio is used to determine how easily a company can make its principal plus interest (debt-service) payments on outstanding debt. It is critical in determining the cash-flow capacity as part of assessing a Host's creditworthiness. Financiers normally require a debt-service coverage ratio higher than 1.5.

Capital

2.7 Does the Host have a positive net worth and has it been profitable for at least the past 2 years?

Net worth is the remaining assets after subtracting total debt from the company's total assets in its balance sheet. If debt exceeds total assets, the net worth is negative, and the Host is deemed to be not financially viable. In many countries (like the US) this automatically classifies the company as legally bankrupt. Consequently, Financiers require the Host to minimally have a positive net worth. Additionally, most of them require Hosts to be profitable for the most recent 2 or 3 years or for a longer period of time. In some cases, Financiers will consider providing funding to EEPs even if the Host has not been profitable in recent years, but typically this is only the case when the Host has a financially strong parent company or a third-party guarantor willing to guarantee repayment, or when the Host can provide marketable collateral.

Collateral

2.8 What is the Host's collateral or guarantees status? Any evaluation reports?

Giving collateral to a Financier means that a Host pledges an asset (real-estate or equipment), allowing the Financier to take ownership of the asset if the Host does not meet its repayment obligation. A guarantor is a third party who signs a guarantee document promising to repay the loan if the Host does not meet its repayment obligation. In many cases, third-party guarantee companies require collateral from the Hosts.

Traditionally, financing of EEPs requires collateral or guarantors from borrowers. Some nonprofit institutions (such as the Institute of Industrial Productivity) have recently begun creating credit enhancement products that will allow banks to accept a portion of the cost savings from the EEPs as "collateral," thus replacing traditional collaterals such as properties. While this new concept is being recognized by more and more professionals, it has not yet been put into practice and likely will not be until credible saving guarantee products are readily accepted in the Chinese marketplace. Most banks and other financial institutions have not developed these financial products.

Condition

2.9 Does the Host's business appear stable and is it not in an industry eliminated or restricted by the PRC government?

Financiers should first make sure that the Host has steady business and that no big policy risks threaten its operation in the future. Energy saving is closely related to whether the company is operating and whether it operates stably. If there is no production, there is no energy consumption and thus no energy saving. If a Host's production and operations fluctuate dramatically, its energy consumption and energy savings from the EEPs often do also. The longer the Financiers' investment period in an EEP, the longer they want the Host's record of stable or non-declining business to be.

Financiers will exclude financing EEPs of any company whose core businesses are among those identified to be eliminated by national industrial policy. The 83rd file of the China Banking Regulatory Commission (CBRC) in 2007 clearly states that banks may "provide no credit support to new projects that are categorized as being restrained or eliminated in the national industrial policy. [Banks] can provide credit support to existing production capacity of projects that are restrained but allowed to implement upgrades within a certain period. For projects in the eliminated category, all types of new credit support should, in principle, be terminated, and any previously issued credit should be taken back." A detailed list of industries being restricted or eliminated can be found in National Development and Reform Commission (NDRC), Industrial Structural Adjustment Guidance Catalog (2011 edition). For example, traditional small thermal-power generators with a unit capacity lower than 50,000kW were slated for elimination per the guidance in 2011. EEPs in such small thermal-power plants therefore would not be financially supported.

ANNEX C: TOP 10 KEY PROJECTS FOR ENERGY SAVING

1. Renovation of coal-fired industrial boilers
2. District-level combined heat and power projects
3. Waste heat and pressure utilization
4. Oil conservation and substitution
5. Motor system energy efficiency
6. Energy systems optimization
7. Energy efficiency and conservation in building
8. Energy efficient lighting retrofits
9. Government procurement energy efficient products
10. Monitoring and evaluation systems

Source: National Development and Reform Commission (NDRC), Implementation Opinions on Top 10 Key Projects for Energy Saving during the 11th FYP (July 2006) “十一五”十大重点节能工程实施意见”, 国家发改委2006年7月颁布。See http://www.sdpc.gov.cn/zcfb/zcfbtz/tz2006/t20060802_78934.htm.

Many policies specify the types of technologies eligible for the incentives. For example, the “Financial Rewards to Energy Saving Technology Upgrade” initiative of the Ministry of Finance and the National Development and Reform Commission (NDRC) require that recipient projects be classifiable in one of the five key energy-saving programs in the 10 energy-savings categories of the 11th 5-Year Plan (i.e., coal-fired industrial boilers (or kilns), waste heat and waste pressure recovery, oil saving and substitute oil, electric motor system upgrades, energy system optimization).²⁰ Another example is the Suzhou Industrial Park Energy Conservation Special Fund, which applies to EEPs such as those designed to save energy in electric motor systems; air conditioning systems; green lighting; combined cooling, heating, and power systems; industrial boiler (or kiln) renovation; and waste heat and pressure recovery.

Toward the end of the 11th 5-Year Plan, the central government issued its “Suggestions about Promoting Energy Management Contracting and Accelerating the Development of the Energy-Saving Service Industry” to accelerate China’s implementation of energy-saving measures and to promote the development of the energy-saving service industry. The government added energy services companies (ESCOs) to its list of enterprises that may receive fiscal rewards from special funds dedicated to energy savings. In 2010 the central government allocated 2 billion RMB for supporting ESCOs in implementing conservation projects that use energy performance contracting in industries, buildings, and transportation. In addition to direct subsidies, ESCOs can also enjoy fiscal benefits, such as temporary exemption from sales taxes.

ANNEX D: CHINESE GOVERNMENT FISCAL INCENTIVES FOR EEPs

During the 11th 5-Year Plan, Chinese governments at all levels have launched different incentive policies and relevant funds for energy efficiency technical retrofitting, including subsidies for energy auditing fees, subsidies for capital investments of EE equipment, and considerable financial rewards based on the amount of energy saved. The incentive policies of the central government are mainly focused on large enterprises, while those of provinces, cities, and districts are for smaller businesses.¹⁸ The types of incentives governments use and the level of support vary from region to region.

Subsidies for energy auditing fees are an example of the variation among different levels of Chinese government. In some cases this subsidy is in the form of a lump sum (e.g., Jiangsu Province provides 20,000 to 30,000 RMB to each company that performs an energy audit); in other cases the subsidy is a percentage (e.g., Suzhou City provides a subsidy as high as 20% to 50% of the audit cost). Many local governments set a cap for the subsidy (e.g., some Beijing districts and counties provide a one-off subsidy for an overall energy audit fee, and one single subsidy can be up to 200,000 RMB). To subsidize upfront capital investment, some local governments like Suzhou Industrial District reimburse as much as 30 percent of the project equipment and technology cost. There are also financial rewards based on energy saved enabling companies to receive millions of RMB from central and local governments. Central- and local-government rewards per ton of standard coal saved can be considerable; 600RMB per ton of coal equivalent (tce) saved Shanghai in 2010, for example.¹⁹

ANNEX E: LIST OF TYPICAL BANK-ACCEPTABLE COLLATERALS

1. Pledge 质押品	loan-to-value rate 抵质押率
a. Certificate of time deposit 定期存单	up to 90%
b. Treasury bond 国债	70–90%
c. Gold 黄金	~80%
d. Bank notes and bills 银行本票和汇票	up to 90%
e. Financial bonds 金融债券	50–85% depending on the rating
f. Corporate bond 企业债券	50–85% depending on guarantee and rating
g. Notes receivable 应收票据	40–90% depending on acceptance
h. Equity ownership 股权	20–50% depending on the rating
i. Charging right 收费权	~70%
j. Accounts receivable 应收帐款	~50% if accepted after assessment
k. Warehouse receipt 仓单	up to 50%
2. Mortgage 抵押品	loan-to-value rate 抵质押率
a. Land usage right 土地使用权	30–60% depending on location
b. Buildings 建筑	30–70% depending on the age
c. Universal equipment 通用设备	up to 50%
d. Special project equipment 专用项目设备	~20%
e. Vehicles 车辆	~50% of net book value
f. Inventory 存货	usually ~20%

Source: Agricultural Bank of China, Bank of China, Huaxia Bank, and interviews with the lending officers of related banks in late 2011.

ENDNOTES

1. Liyong Zhu, “Probing into China’s EEP Market Investment and Financing Model: Exploring New Models for EEP Loans” (in Chinese): http://www.emcsino.com/html/news_info.aspx?id=592.
2. Banks in China normally prefer energy efficiency projects with a simple payback period of less than 3 years. However, some banks finance large waste-to-energy projects with a simple payback period of around 5 years.
3. Compared to startups with a much shorter operational history, companies with more than 3 years of successful operational history are less risky for investors. Historical information is also used to judge the reasonableness of the proposed EEP and establish an energy consumption baseline, which is critical for assessing an EEP’s ability to achieve the targeted energy and cost savings.
4. This is a China-specific requirement. All companies need to have a business license awarded by a local government authority and renewed on an annual basis.
5. Compromising aspects could include appearance on the “attention list” of the State Administration of Foreign Exchange or violations of environmental regulations. Some Financiers will require that the Host’s major shareholders have no criminal record.
6. For example, the Agricultural Bank of China evaluates the collateral value of universal purpose equipment at up to 40% of its cost only.
7. UNDP-GEF—Energy Efficiency Financing-Romania-English P12 point 4.
8. These encouraged EE technology catalogues are developed and updated by the NDRC. The first batch was announced in May 2008 (<http://hzs.ndrc.gov.cn/newzwx/W020080623604376499570.pdf>), the second in December 2009 (http://www.sdpc.gov.cn/zcfb/zcfbgg/2009gg/t20100111_323881.htm), the third in November 2010 (http://www.sdpc.gov.cn/zcfb/zcfbgg/2010gg/t20101208_385094.htm), and the fourth in December 2011 (http://www.sdpc.gov.cn/zcfb/zcfbgg/2011gg/t20120104_454967.htm).
9. Equipment suppliers normally provide rated power efficiency indicators and state the expected efficiency improvement as a percentage, but in estimating the savings such data must be considered along with the operating parameters of the equipment being retrofitted. It is not appropriate to base energy savings estimates solely on the rated performance of the equipment, since it might be used in a different physical environment, thus creating inaccurate saving data. Data on the operating or running hours of the targeted energy use equipment or system are needed to calculate the energy savings given the efficiency enhancement percentage. Energy savings should refer to the actual situation of the Host.
10. An exception to this is with waste heat power generation projects for cement or steel plants where a cost estimate can be considered reasonable if it has a cost of 6,000 to 8,000 RMB per kilowatt of electricity generation capacity.
11. The exact percentage varies from industry to industry as per Notice of State Council on Adjustment of Equity Capital Ratio in the Fixed Asset Investment Projects [2009] No. 27, in May 2009 《国务院关于调整固定资产投资项目资本金比例的通知》，2009年5月发布。See http://www.gov.cn/zwgk/2009-05/27/content_1326017.htm.
12. Loans to corporate are classified by Chinese banks as unsecured loans (~20% of total corporate loans) or secured loans (~80%). There are generally three types of security: (1) guarantee, (2) mortgage, and (3) pledge.
13. The escrow account will be established with money deposited by the Host that is still owned by Host, but its use is restricted to making savings (or debt-service) payments. It is managed by an independent escrow agent who makes the disbursements based on specific instructions. Banks making loans typically require that such an account be established with them. This provides two benefits: (1) a form of cash collateral and (2) cash management to ensure timely payments.
14. The 2012 one is available at http://www.sdpc.gov.cn/zcfb/zcfbgg/2012gg/t20120206_460309.htm.
15. The most recent one is available at <http://politics.people.com.cn/GB/1027/13023325.html>.
16. General technical rules for measurement and verification of energy savings, <http://www.energylabel.gov.cn/UserFiles/%E8%8A%82%E8%83%BD%E9%87%8F%E6%B5%8B%E9%87%8F%E9%AA%8C%E8%AF%81%E6%8A%80%E6%9C%AF%E9%80%9A%E5%88%99-%E5%BE%81%E6%B1%82%E6%84%8F%E8%A7%81%E7%A8%BF.pdf>.
17. Includes preliminary energy audit/solutions study (optional)/feasibility study/basic design/detailed engineering/investment-grade audit.
18. Lawrence Berkeley National Laboratory, 2010. Practices of Energy Audit in China: National and Local Practices and Potential Problems (in Chinese). 劳伦斯伯克利国家实验室 · 2010。《中国能源审计的实践：全国与地方的做法及潜在的问题》。 [http://china.lbl.gov/sites/china.lbl.gov/files/Energy_Audit_Practices_in_China_\(CN\)_Final_0.pdf](http://china.lbl.gov/sites/china.lbl.gov/files/Energy_Audit_Practices_in_China_(CN)_Final_0.pdf)
19. Cao Mingde and Ma Hongchao, Analysis of EPC Law and Policy in China (in Chinese). 曹明德,马洪超, 中国合同能源管理的法律与政策分析。 {Chinese characters missing here?}
20. NDRC, 2006. Notice: Opinions on the Implementation of Top 10 Key Energy Saving Projects of 11th Five Year Plan (in Chinese). 国家发改委 · 2006年。《关于印发“十一五”十大重点节能工程实施意见的通知》 · 发改环资[2006]1457号。 http://www.sdpc.gov.cn/zcfb/zcfbtz/2006/t20060802_78934.htm

ABOUT THE AUTHORS

Xiaoyu Shi is an associate within the Climate and Energy Program at WRI.
Contact: xshi@wri.org

Thomas K. Dreessen is the Founder of Energy Efficiency Project Investment Company (EEPIC) in Beijing. Mr. Dreessen has over 30 years of experience financing EE projects around the world and develops, funds and implements EE projects at industrial process plants throughout China.
Contact: TKD@epscc.com

Alexander Perera is Co-director of the Business Engagement in Climate and Technology team at WRI.
Contact: aperera@wri.org

ACKNOWLEDGMENTS

Special thanks to external reviewers for their important contributions. Reviewers who generously gave of their time, providing important perspectives and valuable insights, include Xiaofan Zhao (Tsinghua University), Jeremy Levin (International Finance Corporation), Calvin Xu (Olympus Capital), Bo Shen (Lawrence Berkeley National Laboratory), Bruce S. Schlein (Citi Group), Chenxi Li and Jianxun Zhao (Industrial Bank China), Frank Li (Peony Capital Limited), Michelle Bai (Johnson Controls Incorporated), Weijia Ye (IED), James Wang, Xiaoling Chen (ICBC), Lanlan Lu (ADB), Eliot Metzger (WRI), Zhang Tao (WRI), Kirsty Jenkinson (WRI), Liu Miao (Huaxia Bank), Yujian Wei (Shanghai Govern), Guangwei Ding (Tangshan Jianlong Iron & Steel Co.), David Tomberlin (WRI), and Robert Taylor.

ABOUT WRI

WRI focuses on the intersection of the environment and socio-economic development. We go beyond research to put ideas into action, working globally with governments, business, and civil society to build transformative solutions that protect the earth and improve people's lives.

Solutions to Urgent Sustainability Challenges

WRI's transformative ideas protect the earth, promote development, and advance social equity because sustainability is essential to meeting human needs today, and fulfilling human aspirations tomorrow.

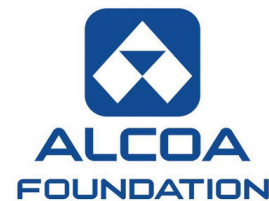
Practical Strategies for Change

WRI spurs progress by providing practical strategies for change and effective tools to implement them. We measure our success in the form of new policies, products, and practices that shift the ways governments work, businesses operate, and people act.

Global Action

We operate globally because today's problems know no boundaries. We are avid communicators because people everywhere are inspired by ideas, empowered by knowledge, and moved to change by greater understanding. We provide innovative paths to a sustainable planet through work that is accurate, fair, and independent.

WITH SUPPORT FROM:



This study is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of World Resources Institute and do not necessarily reflect the views of USAID or the United States Government.



Copyright 2012 World Resources Institute. This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivative Works 3.0 License. To view a copy of the license, visit <http://creativecommons.org/licenses/by-nc-nd/3.0/>