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INTERNATIONAL FINANCE CORPORATION**

**CHINA UTILITY-BASED ENERGY EFFICIENCY
FINANCE PROGRAM**

GEF Project Brief

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CHINA UTILITY-BASED ENERGY EFFICIENCY FINANCE PROGRAM (CHUEE)

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List of Acronyms

ADB	Asian Development Bank
CSC	utility Customer Service Center
CEEF	Commercializing EE Finance (project)
DSM	demand-side management
EE	energy efficiency
EMC	Energy Management Company
ESCO	Energy Services Company
EU	European Union
Fis	financial institutions
GEF	Global Environment Facility
GHGs	greenhouse gases
GDP	gross domestic product
HEECP	Hungary EE Co-financing Project
HVAC	heating, ventilation and air conditioning
I&G	China National Investment & Guarantee Co., Ltd.
IA	Implementing Agency
IFC	International Finance Corporation
M&E	monitoring and evaluation
MoF	Ministry of Finance of the People's Republic of China
NDRC	National Development & Reform Commission of the PRC

NGO	non-governmental organization
PMO	Project Management Office
PRC	People's Republic of China
SMEs	small and medium-sized enterprises
SPP	simple payback period
RE	renewable energy
RFQ	Request for Qualifications
TA	technical assistance
TCE	tons coal equivalent
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank

1 Project Summary

Overview. The Project will organize and provide marketing, development and equipment financing services to energy users in the commercial, industrial, and multi-family residential sectors, to implement energy efficiency (EE) projects. Utilities, gas and/or electric, will be the primary implementation partners for the Project, acting as a hub and offering a “one-stop shop” for end-users to develop their EE projects. The utilities will work in partnership with a Network of suppliers of EE products and services, with financial institutions (FIs) who will make loans for the EE investments, and with a guarantee facility which will provide partial credit guarantees to help secure these loans. This approach is consistent with the GEF strategic priorities *CC-2 Increased Access to Local Sources of Financing for Renewable Energy and Energy Efficiency* and *CC- 1 Transformation of Markets for High Volume Products and Processes*.

Need for EE Investment. China is facing severe energy resource shortages and rapidly growing energy demand. Expanded investment in energy efficiency (EE) projects and equipment is a high Government priority for environmental, macro-economic and enterprise competitiveness reasons. As confirmed by IFC’s meetings with the GEF Focal Point at the Ministry of Finance, the Government seeks to promote private sector, market-based methods to deliver and finance EE projects; partnerships with private sector energy utilities can provide a platform to do so on an accelerated, scalable basis.

Barriers to EE investment. Despite Government policies in favor of EE, market inefficiencies still limit the use of EE equipment. Marketing capacities for EE equipment are underdeveloped in China. Suppliers of EE products and services (“EE suppliers”) do not have strong marketing skills or experience. The process of identifying new customers is slow, and customers lack education on the economic and technical benefits of EE equipment. Further, customers face first-cost financing barriers to acquiring EE equipment.

Utilities as EE Marketing Partners. The Project design is based on a key finding from EE experience in other countries and market assessments in China: that utilities can be effective agents and aggregators for marketing and delivering EE equipment and projects. By working with utilities as the marketing agent, the Project will reach, educate, and deliver EE services to a large set of energy users systematically. Gas utilities are expected to be the first partners. For a gas utility, the Project’s activities will serve their core objective of building gas loads. The Project design is readily applicable to electric utilities and can be an important means to meet China’s energy conservation goals, address power shortages and provide direct financial benefits for both the utility and customers.

Expanding Use of Natural Gas. China’s energy supply mix relies overwhelmingly on coal, a cheap but highly polluting fuel. China’s government is promoting a rapid increase in natural gas use as an energy supply alternative and to address chronic local environmental pollution problems. The Chinese natural gas market is still in its early stages. New gas supplies have just recently come on line. As gas distribution utilities gain new concessions, build out distribution systems and connect new customers, they face a major challenge on the demand side: to build new load, potential customers’ must design, manage, and finance investments on their side of the meter in order to convert to gas use. Thus, the next wave of marketing and investment needed is on the customer side of the meter, where limited access to capital, many small decision makers and a relatively undeveloped service industry impede rapid uptake of gas-using and new efficient technology. The Project will leverage the gas utilities’ interest in building new load to facilitate development and investment in EE projects, including, but not limited to, new gas-using energy systems.¹

¹ Only GHG emissions reductions resulting from energy efficiency gains achieved by the EE projects supported directly by the Project will be counted for the purposes of the Project’s GEF incremental cost

Packaging EE with Gas End-use System Investments. The Project will exploit opportunities created by end-user investments in gas-using systems to simultaneously promote investments in other types of EE equipment. The importance of gas utilities as agents for implementing comprehensive EE improvements in the Chinese market is succinctly explained by William Chandler, who conducted, on behalf of IFC, an assessment of EE markets in China: “For gas to be competitive, gas suppliers must promote efficiency, otherwise the high price of gas makes it uncompetitive with coal. A gas utility is incentivized to package efficiency measures with gas sales in order to penetrate the market.”² Thus, there are direct incentives for gas utilities not only to promote gas systems to increase their loads, but to provide comprehensive EE packages as a means to attract new customers. The gas utility’s expansion drive is aligned with the GEF’s interest in facilitating EE investment. This self-interest provides an important opportunity for IFC and the GEF to leverage the marketing efforts of gas utilities to mobilize investment in end-user EE which otherwise would not be realized.

How Gas Competes with Coal. To date, gas consumption in China has been dominated by a few large power plants and industries. Gas has only recently become more widely distributed and available. For many applications, such as small and medium size boilers for industry and heating, coal remains a significantly lower cost energy source. Environmental regulation to reduce local air pollution is the market driver promoting substitution of gas for coal in these applications. Gas *is* economic now, on its own merits, in many other common applications, for example, in commercial and industrial uses such as air conditioning and cogeneration where gas is substituting for peak and partial peak electricity, and in certain industries, such as pharmaceuticals, food processing, electronics, and glass, where the flexibility and premium clean energy qualities of gas are beneficial for the industrial process, improve product quality, reduce materials waste and lower other non-energy operations and maintenance costs. The Project will work with its partner utilities to assist in developing all EE sub-projects which are economic, as determined by the customers themselves. The Project will promote a range of EE technologies and investments which, when undertaken in conjunction with gas retrofits, enable gas to compete with coal.

Reducing Severe Local Air Pollution. In the cities where it will operate, the Project will make a significant contribution toward China’s goal of reducing severe local air pollution. Replacing highly polluting coal with more extensive use of natural gas has enormous benefits in cleaner air and reduced damage to public health, agricultural productivity and infrastructure as well as reduced GHG emissions. Project operations will target medium size cities where local pollution impacts are very high and development needs greater. For example, the first city being considered for Project implementation with the initial partner utility is Shijiazhuang in Hebei province, population approximately 4 million, an industrialized city 200 km southwest of Beijing ranked by the Chinese State Environmental Protection Agency as the seventh most polluted city in China. The EE sub-projects which the Project will support will significantly help city officials achieve their local pollution reduction objectives, and thus contribute to improving the lives, health and economic conditions of city residents.

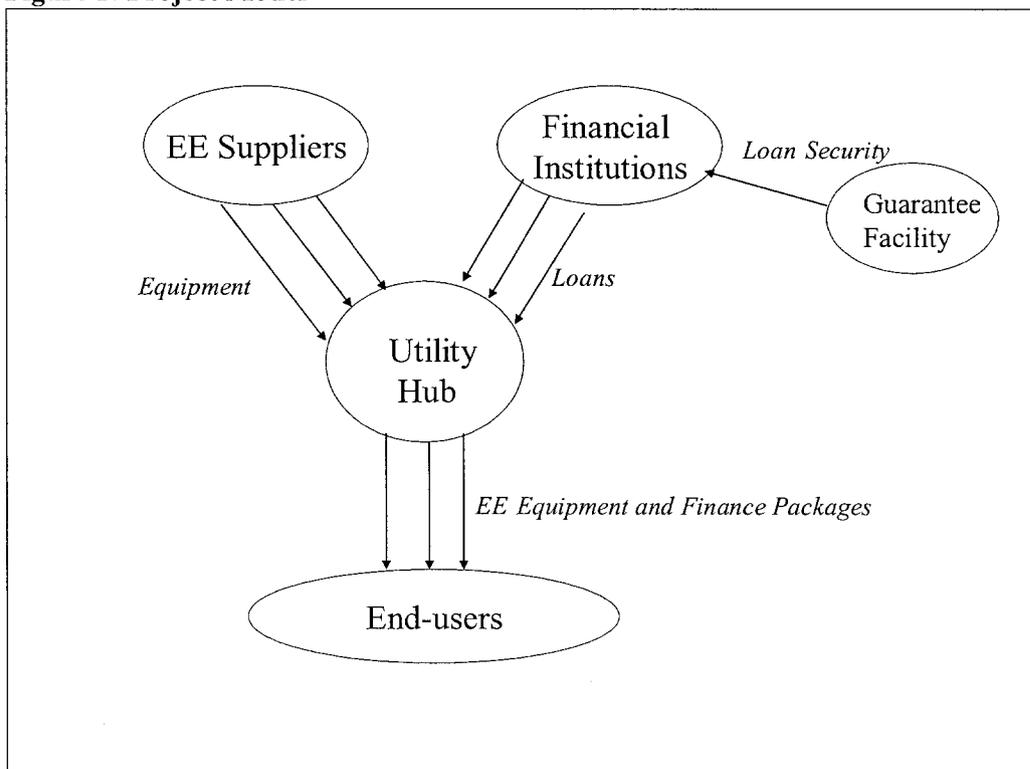
Project model: Utility hub to identify, market, finance, aggregate, and deliver EE projects. The Project addresses EE marketing and finance barriers by creating a utility hub that will provide a “one-stop shop” for the marketing, design, financing and delivery of EE projects. Participating utilities will work in cooperation with a Network of suppliers of EE equipment and services, with financial institutions, and with a financial guarantee facility. The utility hub will provide the customer with a single point of contact

analysis; GHG emissions reductions resulting from the lower carbon intensity of natural gas fuel substituting for other fuels will *not* be counted.

² Personal communication, September 29, 2004.

for project development and finance³. This is illustrated in Figure 1, below, for one utility, though multiple utilities will participate in the Project. Please refer to Annex G for a more detailed schematic diagram.

Figure 1: Project Model



The establishment of a utility hub that consolidates the equipment, design, service and finance as a single offering introduces marketing and transactional efficiencies that will lead to a substantial increase in EE project deal flow. A significant strength of the Project model is that the utility is able to systematically identify and aggregate EE projects within its service territory, and thereby quickly scale up the volume of EE transactions.

Overcoming financial barriers. Arranging equipment finance for customers is a central component of the Project which will enable the EE project investments. Thus, the Project's partner financial institutions will play an essential role. The Project will develop a Guarantee Facility that will help mobilize and support local bank financing for EE loans. Other IFC/GEF projects, such as the IFC/GEF Hungary Energy-Efficiency Co-finance Program (HEECP) and Commercializing Energy Efficiency Finance Program (CEEF), have effectively used GEF funds for credit enhancement to jump-start and expand delivery of EE financial services by local financial institutions. A similar model is incorporated in the new GEF-supported Russia Sustainable Energy Finance Program.

Project Activities: The Project will have four core activities.

³ GEF funding will not be disbursed directly to a utility partner. GEF funds will reside with the Project Management Office's account to co-fund TA activities, and operating and overhead related expenses. IFC through its Project Management Office will retain control of GEF funds allocated to the guarantee facility through an escrow account type structure. For more details on the use of GEF funds see Section 7.

1) The Project will **create, within partner utilities, a “Customer Service Center” (CSC)** which will act as a hub, facilitating relationships between end-users in its service territory, the suppliers of EE products and services, and financial institutions who can lend for EE investments.

2) In order to strengthen the ability of partner utilities, FIs, and EE suppliers to deliver EE investments, the Project will provide **capacity building in marketing and finance**. As part of this capacity building, the Project will **develop standard equipment and financing packages** that are suitable for commonly-found applications. The Project will also create a Network of qualified EE suppliers who will receive capacity building technical assistance, help design the Project’s standard equipment packages, and compete for sub-projects.

3) The Project will work with a suitable partner to **develop a Guarantee Facility** designed to mobilize and support EE lending from local FIs. GEF funds will be used to support this guarantee.

4) In order to recruit additional utility partners (both gas and electric), the Project will conduct a **utility outreach program**. The outreach program will share the Project’s tools and methods with a wide utility audience. It will also work more closely with motivated utilities who meet certain criteria (including willingness to co-finance the Project, and commit significant marketing resources to the effort), to train them in setting up a utility-based EE hub. The Project expects to establish partnerships with up to four utilities.

Utility partnerships. Gas utilities are logical first partners for the Project: the economics of gas use compels them to learn and practice the marketing of EE gas equipment.⁴ IFC has identified a strong potential gas utility partner willing to act as a market leader, Xinao Gas Holdings, Ltd., (Xinao), which operates under government gas distribution concessions in 39 cities serving over 18.5 million people, primarily in middle-size cities in central and eastern China. Xinao estimates a total demand for EE equipment financing in just four of its territories alone in the range of 600-800 million RMB (\$70-95 million). In addition, IFC has identified other utilities, including Wah Sang Gas and Panva Gas to target for its utility marketing and outreach program.

IFC will also seek to replicate the Project model among electric utilities. Their interest will depend on the circumstances of their particular power system and the financial benefits that can be created through strategic implementation of EE and demand side management (DSM) projects. For this reason, the Project will perform cost/benefit analysis of EE/DSM projects from the electric utility perspective as part of its work to recruit electric utilities.

Greenhouse gas emissions reductions. IFC estimates that the Project will directly support financing of US \$120 million in EE sub-projects, which will achieve, in the aggregate, an estimated 4.81 - 9.63 million tons carbon equivalent emissions reductions.⁵ The GEF’s cost per ton of CO₂ GHG emissions reductions achieved by EE projects directly supported by the Project is estimated to be between \$0.77 to \$2.17. This cost range reflects, amongst other key variables, (i) the volume of EE sub-projects ultimately implemented with Project support, which directly affects the amount of emissions reductions achieved, and (ii) loan payment performance, which affects actual expenditure of GEF funds used for guarantee reserves.

⁴ In working with gas utilities, the Project will develop EE projects associated with the use of gas and will also explicitly seek opportunities for additional EE improvements to be implemented as a package with end-users.

⁵ These calculations are preliminary and will be developed in greater detail with reference to specific representative sample EE sub-projects during Project appraisal. See Annex A - Incremental Cost Analysis, for discussion of methodology for calculating GHG emissions reductions attributable to the Project.

Sustainability and Replication. The Project is highly sustainable, because it will establish within the partner utilities a Customer Service Center (CSC) which is highly complementary to the core business, and can continue to operate economically after the Project is completed.

The Project has high potential for replication within China. The Project will seek to replicate its methods in additional service areas of partner utilities, through direct financial support with a select set of additional utilities, and through education and training with a broader set of utilities.

The Project also has replication potential with FIs and electric and gas distribution utilities globally through the portfolios of the IFC Infrastructure and Financial Markets Departments. The IFC Infrastructure Department has expressed interest in replicating the Project model with its investee utilities. The Infrastructure Department supports the Project and will closely monitor its progress. If the Project is effective at building EE markets while also improving utilities' profitability, then IFC is prepared to seek applications for the Project's methods broadly across its utility portfolio; IFC has had initial discussions with a Brazilian and an Egyptian gas utility with immediate interest in replicating the Project model. Thus, this GEF Project will directly leverage IFC's mainstream investment activities, repeating the successful replication experience in Eastern Europe discussed in Section 6 of the Project Brief..

2 Project Development Objective

2.1 GEF Strategic Priorities

The Project is being submitted under GEF OP 5, Removal of Barriers to Energy Efficiency and Energy Conservation. Its approach is consistent with the GEF strategic priorities *CC-2 Increased Access to Local Sources of Financing for Renewable Energy and Energy Efficiency* and *CC- 1 Transformation of Markets for High Volume Products and Processes*.

2.2 Project Development Objective

The Project's development objective is to create effective delivery mechanisms for systematically developing, implementing and financing EE projects, via partnerships with private sector energy utilities who act as the lead marketing partner, facilitator and aggregator.

The Project also has several additional objectives:

- (i) promote the entry of new EE technology into the Chinese market, including efficient gas-using technologies;
- (ii) promote the growth and business development of EE project, equipment and service companies in China;
- (iii) build the capacities and experience of local financial institutions in EE project finance, provide more favorable credit conditions to borrowers, and promote financial innovation in this market;
- (iv) provide practical demonstrations and develop effective methods for how utilities can serve as a platform for marketing and delivering EE projects and services in ways that benefit the customer, the utility and the general economy and society;
- (v) provide experience with utility-based EE finance methods that can be replicated by IFC with distribution utilities in other countries.

3 Strategic Context and Project Rationale

3.1 Country Eligibility

The People's Republic of China ratified the UNFCCC on January 5, 1993.

3.2 Country Drivenness

Chinese Government Support, and consultations with Chinese actors.

The Project is a product of a request made by the Ministry of Finance/GEF Focal Point to IFC to design and implement a new private-sector based energy efficiency (EE) and/or renewable energy (RE) finance initiative, to be supported by GEF funds under the Climate Change focal area. On-going dialogue between IFC, the Ministry of Finance and several motivated private sector actors, including utilities, FIs, equipment suppliers and service providers, has enabled IFC to develop a country driven project, which: (i) addresses and is aligned with the Government's strategic priorities for energy and environment as set forth by the National Development and Reform Commission, Eleventh Five-Year Plan and the Energy Conservation Law; (ii) operates on a commercial basis with existing, viable private sector market actors; (iii) responds to the EE marketing and finance barriers, and, (iv) supports the Government's priorities for accelerating the use of cleaner burning natural gas. At each stage of development of the Project IFC has been in communication with the Ministry of Finance, which endorses the Project.

3.3 Brief Review of Chinese Government Policies Related to the Proposed Project.

This section briefly reviews the major relevant Government policies related to the Project.

10th Five-year Plan. The current five-year plan (2001-2005) sets goals of improving the energy infrastructure, increasing the share of energy provided by natural gas, and reducing coal use through various measures, including energy conservation and efficiency.

11th Five-year Plan. It is expected that the 11th Five-year Plan will call for a tripling of China's natural gas use, from 34 (2003 level) to 100 billion cubic meters. Other anticipated elements of the 11th Five-year Plan that are related to the Project include energy conservation and efficient energy management practices.

Energy Conservation Law. China's Energy Conservation Law, promulgated in 1997, was formulated to facilitate energy savings, improving efficiency of energy use, protect the environment, and guarantee national economic and social development. It calls for increased efficiency of energy use and encourages the development and use of new sources of energy. Accordingly, energy-using entities must "strengthen energy management, and formulate and implement technical measures for energy savings."

National Communications to the UNFCCC. China's Initial National Communication to the UNFCCC (Oct 2004), states that "A key component of China's industrial policies is to reduce consumption of energy and other resources, improve the comprehensive utilization and efficient use of energy and other resources, promote cleaner production, and prevent and control industrial pollution. (...)." Furthermore, "the Chinese government has all along attached great importance to international cooperation in the field of climate change (...)."

Municipal regulations. In order to combat the pollution caused by coal combustion, administrative orders in Beijing and Shanghai have banned the use of coal in new applications, encouraging the use of gas instead. Similar measures have been adopted by many cities, including the target cities considered for this Project.

Achieving local environmental objectives. As the International Energy Agency points out in its review of China's gas market, "Even though China has put in place a range of environmental laws and regulations on air pollution, the lack of adequate means for implementation makes most of them ineffective."⁶ Therefore, market mechanisms, such as those provided by this Project, are needed to help energy users to make investments in EE projects and equipment, including conversions to natural gas use, as a means to help them comply with environmental regulations.

3.4 Background on China's Energy Sector

Recent growth puts strain on China's energy supply. China ranks as the world's second largest energy consumer and the second largest national source of greenhouse gas emissions, mainly as a result of fossil fuel combustion. China's energy-related carbon dioxide emissions in 2001 totaled nearly 870 million tons of carbon. The nation's per capita energy use and emissions are just over half that of the world average.

Chinese leaders have for decades combined population planning, economic reform, and energy-efficiency policies to hold the GDP elasticity of energy demand well below one, meaning that energy use has grown only about 60 percent as fast as the economy.⁷ However, recent data indicate that energy demand grew perhaps one-third faster than GDP in 2002-2003, as production of energy-intensive materials such as steel, cement, and chemicals expanded at extraordinarily high rates. Electricity shortages occurred in late 2002 and intensified during 2003. Current power shortages are estimated at over 20 Gigawatts despite the rapid addition of new capacity.

Coal: the main source of energy, but also of pollution. Two-thirds of China's energy use is now supplied by coal (see Table 1). The local, regional and global environmental problems caused by the use of coal seriously impede future development prospects. The State Environmental Protection Agency estimates that health and property damage attributable to coal combustion costs the Chinese economy over \$13 billion per year. The current five-year plan sets to reduce coal use in percentage terms through various measures, including increasing the share of energy provided by natural gas. Natural gas, which was ignored throughout much of modern China's history, has now been allocated priority.

Table 1 Chinese Energy Use by Fuel Type

Year	Total Energy Consumption Billion Tons Coal Equivalent (EJ)	Energy Consumption Mix (%)			
		Coal	Oil	Natural Gas	Hydro & Nuclear
1980	0.6 (15 EJ)	72	21	3	4
1990	1.0 (24 EJ)	76	17	2	5
2002	1.5 (36 EJ)	66	24	3	8

Source: Batelle 2004.

Energy, environmental and economic benefits of natural gas. The range of energy-related measures for reducing carbon emissions is large. Economic restructuring, efficiency technology, natural gas

⁶ Developing China's Natural Gas Market: The Energy Policy Challenges", Executive Summary, International Energy Agency, December, 2002.

⁷ William Chandler, Holly Gwin, Yu Cong, Xiong Huawen, Zhang Shuang, Zhou Fu Qiu, Zhu Yuezhong. "Private Sector Solutions to Renewable Energy and Energy Efficiency Technology Commercialization, An Assessment of China's Market Structure, Government Policy, and Potential Private Sector Business Initiatives", Beijing, China, May 2004.

substitution, and renewable energy options contribute in roughly equal proportions to potential carbon mitigation estimated at more than 800 million tons by 2030. A study conducted for the Pew Center on Global Climate Change concluded that natural gas is perhaps the most-overlooked mitigation potential in China because this low-carbon fuel was ignored for many decades by Chinese planners.⁸

Increased natural gas use has other benefits besides the reduction of CO₂ emissions. Most importantly, it will help reduce severe local environmental pollution. Further, an increased role for natural gas in the country's energy mix will contribute to the country's energy security, as China today is already dependent on external sources for one third of its oil supply. The replacement of coal-fired equipment with equipment that runs on natural gas will also allow the modernization of industrial activities, making them more competitive.

3.5 Current State of Chinese Natural Gas Market and Barriers to Expansion

Nascent supply infrastructure: a "supply push" for the natural gas market. In its 10th Five-year Plan for the energy sector, the Chinese government confirmed its determination to increase the share of natural gas in the country's energy supply mix within the next five years and beyond. Evidence of this determination includes the construction of the country's first LNG import terminal in Guangdong and the decision to build the 4000- km long "West-East Pipeline" to bring natural gas from the country's far west to Shanghai in its far east. The target is to double the share of natural gas in China's total primary energy supply by 2010 from the current level of 3 per cent, and to build a well interconnected national gas supply network by 2020.⁹

Other major new projects to import liquefied natural gas (LNG) have been launched and more are in the planning stage. This gas will be used directly in power generation and will also feed high pressure gas supply lines for distribution in residential, commercial and industrial sectors. Many cities have established concessions for development of gas distribution systems, and investment is proceeding rapidly in the build-out of the distribution network.

Current gas consumption in China is highly concentrated with a few industries and power plants. The broader consumer market for gas and gas-using equipment is very young in China, and the market trend for broader gas use is not yet well-established.

What's needed now: a "demand pull" on the use of natural gas. To date, China's strategy and actions to develop its gas market have been mainly "supply-push". Presently, the most critical issue restraining China's gas sector is the development of end-use gas market demand.

Indeed, the International Energy Agency's assessment of the Chinese gas market concludes that to achieve the desired target of doubling the share of natural gas in China's energy supply mix within the decade, "...the challenge is in the downstream sector. In most parts of China, gas will find it hard to compete against coal in power generation. In local gas distribution, much needs to be done to ... introduce commercial marketing and management."

The report further finds that "[China]...undoubtedly offers huge market potential for natural gas, driven by the size of its population, economic growth, and the increasing need for cleaner energy. But this potential

⁸ William Chandler, Roberto Schaeffer, Zhou Dadi, PR Shukla, Fernando Tudela, Ogunlade Davidson, Sema Alpan-Atamer, *Climate Change Mitigation in Developing Countries: Brazil, China, India, Mexico, South Africa, and Turkey*, Pew Center on Global Climate Change, Washington, October 2002.

⁹"Developing China's Natural Gas Market: The Energy Policy Challenges", Executive Summary, International Energy Agency, December, 2002.

may remain only theoretical if Chinese policy-makers do not take into account the *relatively poor competitiveness of natural gas* vis-à-vis alternative fuels, the *marketing efforts* required of gas sellers/distributors, and the realistic estimation of major challenges that must be overcome to build up the demand for gas. Consequently, gas market development must, in the first instance, rely to an extent on a *multitude of small and medium-sized consumer entities* who must be convinced one by one to opt, willingly and happily, for natural gas as the fuel of choice and to pay for the cost of conversion.” (Emphasis added).

Finally, a joint Sino-US report on expanding China’s natural gas market notes that “China will need to train thousands of specialists over the coming decade if it is to boost natural gas use significantly. ... Chinese natural gas specialists are often well equipped with analytical and technical skills, but *lack skills in business planning and finance* that help create successful business models.”¹⁰ (Emphasis added).

To summarize: EE investments including increased use of natural gas hold great potential for reducing China’s CO₂ emissions and alleviating its energy supply crisis. The market for end-use of natural gas is still evolving, and faces certain barriers:

- Gas is frequently more expensive in many applications when compared to coal.
- EE and gas equipment sellers often lack capacities to market EE equipment effectively.
- Gas utilities have a low level of marketing and finance skills to work on the customer side of the meter.
- The multitude of potential customers creates high transaction costs for EE upgrades.

The economics of natural gas use in China. While the barriers listed above establish the need for the Project, it is the economics of natural gas use that in part drive the Project’s design and its suitability for the GEF. Economically, the main competitor to natural gas is coal. Coal costs approximately 50% less than gas on an energy unit basis (although coal prices are rising more rapidly than gas). Energy efficiency investments undertaken in conjunction with gas retrofits enable gas to compete with coal. This is an essential feature of the Project when working with gas utilities: co-marketing EE investments with new gas-using energy systems. The Project will offer end-users EE improvements as an integral part of package that can include gas-using equipment.

A primary gas application is for boilers for heating and industrial process. Coal dominates the boiler market. Industrial boilers in environmentally sensitive urban areas are being converted to gas, or, in many cases, simply shut down and moved to outlying areas. For urban residential applications, conversions from coal to gas are being driven by environmental regulations. The Project will address all these markets.

Gas use *is* economically attractive now when substituting for peak and partial peak electricity. Many electric utilities have time-of-use power tariffs and, particularly for commercial sector customers, on-peak and partial-peak power can range from USD 7-11 cents per kwh. Gas-fired distributed generation, including small scale cogeneration and tri-generation (power, heat and cooling), is a field ripe with opportunity. Economic applications, with simple paybacks in the 2.5 to 4 year range, include air conditioning, refrigeration, cogeneration, and small power generation applications, especially for commercial sector customers (e.g., office buildings, hotels, and hospitals). IFC’s market research has identified many such projects, with multiple equipment suppliers and project developers pursuing these markets.¹¹

¹⁰ Pacific Northwest Laboratories, University of Petroleum, Beijing. *Expanding Natural Gas Use in China*, April 2002.

¹¹ These EE equipment and project companies include Cummins, PowerU, Sebesta, Shuang Liang Air Conditioning, Energy Net, Broad Air Conditioning, and Opra.

Further, many industrial gas applications are already economic now, when substituting for peak and partial peak electricity or when gas quality brings added benefits. Indeed, the flexibility and premium clean energy qualities of gas are beneficial for industrial processes used in the manufacture of glass, pharmaceuticals, and electronics, or in food processing. The economic benefits of these applications include improved product quality, reduced waste and lower operations and maintenance costs.

Every potential investment in gas end-use equipment is a window of opportunity for promoting EE that should not be squandered. Once a customer has installed new equipment, that equipment is likely to be in place for 5-30 years, depending on the end use. The Project can help lock in EE sub-projects *now* whose benefits will last long into the future. The other side of the coin is that if EE upgrades are not incorporated into ongoing investments, the inefficient equipment will remain in place for years to come, and an opportunity for affordable EE upgrades will have been lost.

An additional Project objective is to assure that the gas equipment used is the most efficient possible, reflecting best available technology. Development of the gas equipment industry, including assistance in bringing new EE/gas technologies and firms to China, and supporting development of joint ventures between domestic firms and international firms to sell and subsequently manufacture equipment in China, will be one aspect of the Project's technical assistance program working with EE Suppliers and utilities. For example, one such case between a Dutch manufacturer of gas cogeneration and absorption chiller equipment and the initial partner utility is already under development. Fostering incremental improvements in the efficiency of gas-using equipment is an important secondary objective of the Project. In the first instance, however, the Project's primary objective is to implement an effective marketing and delivery mechanism for EE and gas-using equipment, in partnership with the utilities. The Project addresses marketing and finance barriers to implementing EE and gas-using projects. The Project will help assure that these barriers to expanded gas use on the customer side of the meter are overcome so that gas sales targets of partner utilities can be accomplished, and, further, that, in the process of making investments in gas-using equipment, end-users also implement other cost-effective EE investments.

3.6 EE Equipment Finance: Its Role, and Related Barriers

EE equipment and projects are capital intensive and costly. Customers needing to make these investments frequently face first cost barriers and need financing; yet, financing is not organized and readily available to support EE equipment/project sales. Principle financial market barriers to EE/gas equipment and project implementation which are most acute and relevant in China include the following.

Lack of Bank Experience with EE and Project Finance. Banks lack experience in EE finance. Banks and other FIs typically assess risk and make credit risk decisions on the basis of very traditional evaluations of fixed asset collateral as security and often lack experience preparing *pro forma* documents (business models and financial projections) to assess risks on a project finance and cash flow basis.

End-user Credit Risks and Need for Credit Enhancement. The Chinese banking sector is characterized as highly liquid, but risk averse. Access to credit is limited, especially for viable small and medium scale enterprises (SMEs) and other institutions who historically have not used loans. In financial institution (FI) interviews and assessments IFC has conducted, some of which included 3-4 meetings with the same FI to explore finance structure options in depth, all FIs have inquired insistently regarding the source and level of guarantees for securing the EE equipment loans. China's FIs typically assess risk and make credit lending decisions on the basis of fixed asset collateral and often require collateral valued at 200%+ of the loan amount. Some borrowers are willing and able to provide necessary collaterals, but many will not. Further, EE equipment tends to have low collateral value. To complicate the picture further, potential borrowers often are borrowing for the first time, and therefore do not have a credit history or other

information available on which lenders can make credit decisions. A barrier specific to China is the fact that national banking regulations cap or collar interest rates, limiting banks' ability to charge risk-weighted interest rates. In response, a commercial guarantee industry has emerged in China, and banks have grown accustomed to receiving guarantees. These guarantee companies do not currently address the needs of the EE finance market. But, a guarantee instrument is a form of credit enhancement which banks readily recognize.

Small Size Projects. Banks typically prefer large loan amounts, e.g., above 20+ million RMB (\$2.5 million) whereas gas and EE projects tend to be relatively small, with many projects in the 2-10 million RMB (\$250,000-\$1,250,000 range). Market aggregation could overcome this small project size barrier and make equipment lending more attractive to participating banks.

Lack of Medium and Long-term Financing. Though some banks have medium and long-term resources to lend, tenors on loans to SMEs and other small borrowers still tend to be very short (one to two years), due to short risk horizons. Availability of longer term financing, even three to five years, will further open the market for EE projects and equipment. Addressing end-user credit risk barriers can help banks use existing resources to make medium term loans.

3.7 Marketing Barriers to the Increased Use of EE Equipment

In addition to the equipment finance barriers discussed above, EE in China also faces some more general marketing barriers. Customers, suppliers of EE products and services, and utilities each face their own barriers that impede the wider uptake of EE equipment.

End-User's Perspective (1): Need for End-User Education. In the rapidly evolving Chinese business environment, there is a tremendous on-going need to educate energy users on the opportunities for and benefits of EE investment.

End-user's Perspective (2): Complexity is Discouraging Development of EE projects is a service intensive task, with multiple steps required for their effective preparation. Customers often lack the technical engineering skills needed to develop projects on their own. These barriers are compounded by the relatively high pre-investment transaction and development costs and risks of preparing EE projects. It remains daunting for an end-user to implement an EE project; the end-user must meet with one or more suppliers, assess their proposals (without outside support), oversee installation contracting, and handle the financing. Thus, the Project is designed to provide end-users with a comprehensive implementation and financing program that offers "one-stop shopping" arrangement for implementing EE sub-projects.

EE Supplier's Perspective (1): Lack of marketing and project development skills. EE Suppliers typically lack the sales and marketing skills that would enable them to tell a compelling story to potential customers.

EE Supplier's Perspective (2): Fragmented end-user market. EE Suppliers generally do not have an existing relationship with their potential customers due to underdeveloped distribution and sales channels. EE equipment sales and installation requires the packaging of engineering services as part of the transaction. The transactions are often too complex for an off-the-shelf retail approach to marketing, and too small in economic value, and the end-user market too fragmented, to be sold on a scalable commission-based sales agent basis.

Utility Perspective: Little Experience with Customer Outreach & Marketing. Gas utilities have relatively little experience in marketing to customers. Their marketing to date has focused on marketing to cities looking to establish gas distribution system concessions, and advocating local government policies

supporting gas use. Active marketing of gas-using equipment and provision of customer technical services to create and implement site-specific solutions, while logical and natural functions of gas utilities, have not yet been done simply because the industry is so new. The gas industry is only now at the stage where these capacities are needed and their development is now absolutely timely.

4 Project Description

4.1 EE Project Marketing

The Project's basic scheme has been designed to create an effective and scalable mechanism for marketing and delivering EE projects. The EE market consists of large numbers of relatively small, distributed projects. A central challenge in promoting EE is how to market and deliver EE projects and services effectively at the scale that EE's economic and environmental benefits warrant. The "Achilles' heel" of the EE industry is the long sales process with end-users. Each EE project involves complex site-specific and customer-specific technical and financial details. Selling EE individual customer-by-customer has high transaction costs and is very time consuming.

The Project will introduce simple yet fundamental methods in how EE is marketed, leveraging the self-interest of utilities to overcome existing market barriers, accelerate the project marketing process and create new transactional efficiencies.

- In each target market (typically, a medium to large city), a utility partner will take advantage of its customer base and service territory to systematically identify and aggregate sub-projects.
- EE equipment and service suppliers will be grouped into a Network that will make it easier to match customers with EE Suppliers that can implement projects.
- The Project will work with the EE Suppliers to develop a set of standard "off the shelf" equipment packages for typical and economically attractive applications.
- In cooperation with partner FIs, the Project will devise a set of standard loan products that can be offered to small and medium-sized customers, thereby streamlining the financing process.
- A Guarantee Facility will provide credit enhancement to help secure the loans, facilitating and increasing access to finance.

Before the Project, an end-user might have been approached by one or several suppliers with which it had no relationship. The supplier typically would face high costs and difficulties to gain the customer's attention and present a compelling offer. If a customer is persuaded to implement an EE project, finding finance would be complex and discouraging, and the EE retrofit would often not take place. Further, this process would occur technology-by-technology and EE supplier-by-supplier, so the customers would have a fragmented rather than comprehensive treatment of their EE potential.

With the Project, the customer is approached by a known business partner – the utility. The utility is a credible "one-stop shop"; it presents the customer with economic and engineering analyses that clearly show the advantages of an EE project, develops an EE package for the customer, and helps arrange financing for the sub-project. The use of standardized equipment and finance packages makes it easy for the utility to scale up the project and generate a high volume of sub-projects.

An elegant –and necessary - aspect of the Project design is that each party acts in its own self-interest. The customer wants to reduce energy bills and increase competitiveness through an equipment upgrade; the supplier wants to increase sales; the FI is attracted by the promise of a steady deal flow, backed up by credible guarantees; and the utility is able to build load (in the case of a gas utility), manage load and create system benefits (in the case of an electric utility), strengthen customer relations, and fulfill Government directives on energy conservation.

4.2 Basic Scheme of the Project

The Project will organize and provide marketing, development and equipment financing services to commercial and industrial sector energy users to implement energy efficiency (EE) projects. Utilities, gas and/or electric, will be the primary implementation partners for the Project, acting as a hub and offering a “one-stop shop” for end-users to develop their EE projects.

The basic scheme for the Project is summarized in Figure 1 in the Summary section or in more detail in Annex G, which depicts the Project’s design as it will function for one utility; up to four utilities will be recruited for Project implementation, so this structure will be replicated.

This Section presents the planned Project methods in greater detail. It starts with an overview describing:

- target markets, and
- types of EE projects and equipment covered.

Then the roles of each main actor, and the technical assistance program, are presented:

- utility role developing EE projects with customers,
- role of the EE equipment and service providers,
- role of the FI partner, including a description of the finance and credit enhancement mechanism, and estimated terms of financing to customers, and
- technical assistance program.

Finally, this section addresses steps involved to develop and start up the Project:

- recruitment and selection of utilities,
- outreach program to utilities, and
- appraisal agenda and next steps for Project preparation.

4.3 Target Markets

The Project will target commercial and industrial customers in the service areas of partner utilities. As a secondary priority, municipal/institutional sector customers, e.g., hospitals and government buildings, and multi-family residential sector may also be targeted. The ultimate sectoral focus will be determined by market dynamics. IFC’s experience with similar market-driven projects indicates the importance of a flexible approach, which enables the Project to adjust to opportunities that emerge over the life of the Project.

The Project will work with participating utilities to identify and contact interested end-users, offer the Project’s services, and initiate the EE project development process. End-users will be screened for potential EE applications, interest and commitment to undertake EE projects, and creditworthiness. End-users will mostly be existing customers; in the case of gas utilities, some end-users may also be new hook-ups.

4.4 Types of EE Projects & Equipment

The range of EE equipment to be promoted and financed by this Project is expected to include: boilers, cogeneration, small power generation, air conditioning, heating systems, refrigeration, lighting, motors, controls, and other industrial process improvements such as heat recovery. Typical EE projects will consist of a package of equipment and systems, including engineering, installation, and the ancillary project development activities.

In order to make it simple and quick for the utility to sell and the customer to undertake EE improvements, the Project will assemble a set of basic packages that meet a set of commonly-found applications. The packages will be designed in partnership with the EE Suppliers, and will use readily available high-quality high energy efficient equipment, for example, tri-generation equipment (heat, cold, and power) for hotels and commercial buildings, or new boilers for industrial SMEs and multi-family housing.

4.5 Utility Role: Developing EE Sub-Projects with Customers

The utility will have the lead role in marketing, managing the customer relationship, and providing technical guidance and support services to help customers develop their EE projects. The typical steps required for customers to develop EE sub-projects are outlined below.

Project identification.

- Marketing and customer education.
- Desk-level assessment and screening of EE and greenhouse gas emission reduction potential.

Project preparation – technical and economic.

- Site assessment, identifying EE opportunities and applications and making initial economic (cost and benefit) estimates.¹²
- Customer decision on what applications to further develop.
- Further preparation of EE project feasibility study (economic/engineering analysis) and investment plan.
- Customer management decision on which projects to implement.

Project preparation: financial.

- Credit screening of customer.
- Preparation of finance package for the customer, including a guarantee for the FI extending the loan.

Project engineering and installation

- Full engineering and permitting for the project.
- Procurement of equipment and installation contractor.
- Completing legal contracts for project implementation including financing.
- Project installation and commissioning.

Project operation & monitoring

- Project operations, including ongoing maintenance and optimization.
- Independent collection of performance data for Monitoring and Evaluation.

The utility will have the lead role assisting the customer through this process; it will work with the customer on marketing and education, identification and assessment of energy project investments, preparation of feasibility studies and investment plans, and facilitation of customer decisions. The utility will use expert engineering sub-contractors to provide on-site services to customers. The utility will also assist the FI partner to make the project financing arrangements.

¹² This step also includes collection of data on the energy performance of existing equipment, to be used for the calculation of greenhouse gas emission reductions.

The Project will be designed so that it can be scaled up in volume, so as to take the greatest advantage of the utility's central role as a project aggregator.

Overall, the utility will support the customer to make decisions on what projects and equipment to implement, using a combination of its own marketing and engineering staff and services from outside engineering firms. The utility will then assist the customer to procure the EE projects from qualified EE Suppliers. This structure positions the utility to act as the "honest broker" in the customers' interests, to help the customer procure the project that is best for them.

By taking the integrative role in the Project -- systematically marketing to customers, identifying potential EE projects, developing the projects with input from the EE Suppliers, and arranging finance through participating FIs -- the utility will introduce efficiencies into the EE market. This will result in a significant increase in the volume of EE sub-projects in the utility service areas where the Project will operate.

4.5.1 Utility "Customer Service Center"

To manage its roles, the utility will establish a "customer service center" ("CSC") and knowledge center at its headquarters. The CSC will work with the marketing departments in each of the utility's service areas. The CSC, which will have knowledge of EE equipment and applications, will manage the relationships with the EE Suppliers, and will be able to perform engineering studies to advise customers. A portion of the GEF funds will be used as TA to train the partnering CSC's to deliver these services. GEF resources will be used only to share the costs of delivering energy efficiency services to customers and will not support any core business of the utility.

To develop its program, a participating utility must:

- research and compile data on its target city markets;
- conduct surveys of customers to identify their EE equipment project and finance needs;
- work with IFC to develop the EE Suppliers Network that can operate in their areas, including conducting assessments of their technologies; and
- prepare a business plan for its CSC operations; IFC will assist participating utilities to prepare the business plans for their CSC.

The utility will also be asked to make financial commitments for the credit enhancement component of the program, possibly including capital contributions for the Guarantee Facility. Thus, the utility partners will be making significant in-kind and cash contributions to Project implementation.

4.6 EE Equipment & Service Suppliers and Their Roles

4.6.1 Creation of an EE Suppliers Network

The Project will identify, qualify and organize a Network of businesses who provide EE equipment and services and can develop and implement EE projects. The categories of EE Suppliers in the Network will include: engineering companies, mechanical and electrical contractors, equipment manufacturers and suppliers, operations contractors, and full service energy management companies (EMCs) (collectively referred to as "EE Suppliers"). The EE Suppliers Network will be available for use by participating utilities. EE Suppliers will also market their EE projects and services to customers, in coordination with the utility.

The utility will compile information on the types of EE equipment available within its service territory; the utility can then design sub-project packages that can take advantage of locally available equipment. Alternately, if certain types of internationally available equipment are not

present on the local market, the Project can recruit new EE equipment suppliers to China as part of its market development activities. Research to date indicates that this activity will be needed for certain types of gas-using equipment.

The EE Suppliers Network will serve several purposes. Participating Suppliers will benefit from marketing support, capacity building and significantly greater deal flow than they would be able to obtain on their own. Customers will benefit from access to pre-qualified Suppliers and more comprehensive EE project offerings available from the Network. By putting sub-projects out to bid through the Network, the utility can secure low prices for customers. Were the customers to implement the projects on their own, they would likely pay higher prices in addition to incurring substantially higher transaction costs. The Network leverages competitive market forces to bring down prices and project costs.

4.6.2 Recruitment & Procurement of EE Suppliers

The Project will seek to develop EE Supplier relationships which offer a full complement of EE products and services. The Project will solicit applications from EE Suppliers through a procurement process. A request for qualifications (RFQ) process will likely be used to formally solicit information from EE Suppliers as part of Project start-up, in cooperation with the first partner utility. The Project will then qualify companies as EE Suppliers on an on-going basis.

Through training and other events, the Project's activities will build capacities of the EE Suppliers to market and sell their equipment and services; this will be one aspect of the Project's market development objectives and activities.

IFC has begun building a database of EE Suppliers and conducting interviews to assess their capacities. The EE Supplier Database is included in Annex F. IFC will continue to build and maintain the database through Project development and operations.

4.7 Equipment Finance & Credit Enhancement Mechanism

4.7.1 Basic Structure of Financing Mechanism

The basic equipment finance and credit enhancement mechanism of the Project is described below; additional financial mechanism options may be considered and developed in response to changes in market conditions, so flexibility is still needed in Project design.

In the basic scheme, the partner FI(s) will make loans to the energy end-users and project developers. Loans to end-users are expected to represent the large majority of transactions, but the Project will also support loans to EE Suppliers who have long-term energy services contracts with customers.

4.7.2 Loan Origination

Typically, the bank will make loans to customers. Because a guarantee mechanism is to be used, the Guarantee Facility will be directly involved in appraising and making credit decisions. IFC will seek to establish underwriting guidelines and credit scoring systems for each distinct end-user market sector. Credit pre-screening criteria will be used. For existing customers, utility bill payment history can be used as one important factor in credit assessments. The utility can help collect credit information from the customer, and generally assist the customer to complete its application for the loan and arrange the financing. By having some loan origination functions performed by the utility at the point of sale to the customer, transaction costs for the lending bank will be lowered.

4.7.3 *Loan Terms*

Loan terms will be defined together with the FI. Standard Chinese loan documentation will be used. IFC will seek to arrange loan terms of three to five years, although loans longer than three years may be difficult in China's banking environment. Customer down payment requirements will be on the order of 20-30% of total project costs, in line with market practices. In order to present simple and attractive packages that will meet the needs of typical customers, a set of standard interest rate pricing and payment schedule terms will be negotiated with the FI; current interest rates to end borrowers are in the range of 5.57% (lowest at present) to approximately 7% per annum.

4.7.4 *Collections*

Loan payment collections could be performed by the FI. IFC is investigating opportunities to integrate collection of loan payments with collection of utility bill payments. Thus, if the customer does not pay, utility service is cut. This approach strengthens the customer willingness to pay and enhances the credit profile/risk rating of the loan. Collections will likely be monthly, whereas typical bank payment schedules are quarterly. The FI will likely perform the collections and act as collections agent for the utility. Collections costs are also reduced and payment flows are aggregated, making collections efficient.

Customers can also be required to open accounts with the bank as a condition for the loan, and the bank can be given preferred drawing rights on this account for collections purposes. All parties to date believe this is possible and worth exploring but further research on legal structuring is required.

4.7.5 *Credit Enhancement Structure*

China's financial institutions are very risk averse and typically use a traditional fixed-asset collateral approach to securing loans. It is very challenging to get China's financial institutions to assess risk and make credit and lending decisions based on cash flow, the borrower's ability to pay and the project's own revenues. Small and medium size businesses face major barriers to receiving loans for new plant and equipment investments. Borrowers often lack the required collateral. Indeed, a whole guarantee industry has developed in China to address these barriers. Thus, to mobilize local bank financing, it will be important to approach the local FIs with a credit structure they are used to seeing, and that is a guarantee. Providing credit enhancements can also be instrumental in getting FIs to lend for terms longer than one year; longer loan terms will help make the EE project financings affordable.

The Project will work with its FI partner(s) to establish a GEF-supported Guarantee Facility to support loans for EE sub-projects. Guarantee percentages of 90% are anticipated, consistent with current market practices. The Guarantee Facility will have access to a portion of IFC/GEF funds as reserves against which to assume guarantee liabilities. Guarantee Facility reserves will be co-financed with contributions from the utility, EE Suppliers and customer guarantee fees.

One option IFC is exploring is to establish a Guarantee Facility in cooperation with each partner utility. The utility could also make equity contributions to the Guarantee Facility and may provide a "back-up" guarantee supporting the Guarantee Facility's obligations to the lending bank.

Further, IFC expects that many participating EE Suppliers will also provide some limited recourse (finance risk sharing) in some proportion to the value of their sales which are facilitated by the financing mechanism. IFC has found several precedents in the market of this practice. EE

Suppliers can also recover their costs for assuming limited recourse in the pricing of their equipment and services.

Additional typical security for loans will also be structured, including: mortgage on financed equipment, mortgage on other fixed assets, and additional guarantees from equipment suppliers. The Guarantee Facility will integrate security and credit enhancements from all these sources so the lending FI would see one single guarantee. The Guarantee Facility can also charge guarantee fees and these can be used to cover, in part, operating costs and to augment guarantee reserves. The risk sharing formulas between all parties will be further defined in Project appraisal. The level of credit enhancement may vary with the type of transaction and end-user, and, over time, as greater credit experience is gained.

In cases where loans are made to EMCs, it may be possible to work cooperatively with the China National Investment and Guarantee Company, Ltd. (I&G) which is implementing the World Bank Phase II Energy Conservation Project guarantee program; discussions regarding this cooperation are underway.

The estimated sizing of the credit enhancement program and the volume of project loans it can support is described in Section 7.6.

4.7.6 Selection of FI Partner(s)

IFC has held advanced level discussions with Minsheng Bank (an IFC investee), Bank of Shanghai (an IFC investee) and Communications Bank (5th largest state-owned commercial bank). The local branch offices of Mingsheng and Communication banks in Shijiazhuang, one of the target cities for Project launch, have indicated an interest to participate in the Project. Discussions with the corporate offices of both banks are on-going and initial responses have been supportive. Both of these banks have national reach. This is a condition of participation, to ensure that the FI partner can cover all the service territories of participating utilities. Prior to submission of the Project Document to GEF for CEO endorsement an FI partner will be selected.

China has a challenging, generally risk averse and highly regulated financial environment. The strategy for recruiting the bank partner is to design a program that will generate a large flow of demand for loans that will be both secure and profitable. With the utilities serving the market aggregation role, and the availability of resources from the GEF and the other commercial parties to support credit enhancement, an effective financial structure can be created that will be attractive to the FI.

It is possible that multiple FI partners will participate. A competitive process can be used to obtain the most favorable terms from the FIs.

4.8 Utility Outreach and Recruitment of Participating Utilities

4.8.1 Dissemination of Project Methods

As part of the Project, IFC will conduct an outreach program to utilities. This program will have two goals: to identify potential utility partners, and to widely disseminate the Project's methods. Initial elements of the outreach program will begin early in Project operations to identify other utilities interested in the Project. The objective of this early activity will be to qualify a set of new utilities interested in implementing one or more of the Project's components. Actual partners will then be selected using a competitive process.

As Project methods and tools are developed and proven with the initial utility partner, the outreach program will disseminate these tools to other utilities. A range of education and dissemination methods -- workshops, trainings, conferences to share experience and case histories, pairing staff from new utilities with staff of existing utility participants -- will be used, as appropriate.

IFC expects that some utilities may adopt and apply some Project tools and methods -- e.g., the financing mechanism, or the EE Suppliers Network, or creation of a CSC -- selectively and independently without implementing the full set of Project activities and without direct Project financial support. Some new utilities may ask for assistance from existing participating utilities to implement Project methods on an outsourced basis; this can represent a new line of business for existing participating utilities, and a form of Project replication.

4.8.2 Recruitment of Gas Utilities

For a gas utility, the Project's activities will serve core objectives of building gas loads and strengthening customer relationships. Gas utilities are, therefore, well-motivated to participate, and IFC expects them to be the first utility partners.

An initial utility partner is expected to be Xinao Gas Holdings, Ltd., (Xinao). Xinao, (an IFC investee), operates in over 39 cities serving over 18.5 million people. Xinao's service territory is primarily in middle-size cities (2 million inhabitants) in central and eastern China, so the environmental and developmental benefits of this program will reach these populations. Xinao senior management has indicated strong interest and commitment to the Project. Detailed discussions with Xinao are underway and are providing an essential means to refine the Project's design and methods, adapted to Chinese conditions. Through this initial partnership, IFC will develop and refine Project methods that can be applied to subsequent utilities.

Additional utilities will be recruited on a competitive basis. IFC has identified two potential utilities, Wah Sang Gas and Panva Gas as targets for the utility marketing and outreach program and will continue to identify other potential gas utility partners during Project development and operations. IFC will conduct an outreach program early in Project operations to educate prospective utility partners and qualify a set of interested utilities for potential participation.

A request for proposal will then be used to solicit proposals from interested utilities. Selection criteria include: (i) market readiness and potential in their service areas, (ii) senior management commitment, (iii) staffing, management and technical capacities to implement the program and operate a CSC, (iv) willingness and ability to make the in-kind and financial commitments required under the program.

IFC anticipates having up to four utilities participate with full Project support, which includes co-financing of program operations, TA for development of customer projects, and use of the Project's equipment financing and credit enhancement mechanism. As the Project's outreach program will disseminate the Project's methods broadly, IFC expects that various Project methods will be used by utilities that are not Project partners.

4.8.3 Recruitment of Electric Utilities

The Project can be an important means to help electric utilities meet China's energy conservation goals and address power shortages. Despite power shortages and a very high government target of 10,000 MW of electricity conservation over the next several years, IFC has not yet identified electric utilities interested in participation. In general, electric utilities do not appear ready to

serve as a platform for customer end-use EE programs. Their interest will likely depend on the constraints they face in their particular service territory. For example, an electric utility with a peak load problem could gain system benefits from customer load management to shave peak loads; or a utility faced with distribution constraints and facing imminent and costly distribution system upgrades might see the Project as an appealing way to manage loads in target areas so as defer these capital investments. These types of EE/DSM projects have been developed by electric utilities in other countries with great success and have proven to create economic benefits to the utilities, particularly in cases of peak load management.

IFC remains optimistic that electric utility partner(s) can be found, and will continue its efforts to do so. As part of the outreach program, the Project will perform preliminary cost/benefit analyses, from the utility perspective, of EE and other “customer side of the meter” measures, e.g., power factor correction, load management controls, peak shaving, and distributed generation. These analyses will investigate the cost effectiveness and system benefits of EE/DSM. The Project will present the resulting economic data to utility managers and policy makers, so they can be aware of the benefits to the utility of using EE/DSM as one important and cost-effective means to develop their power system and alleviate power shortages.

4.9 Technical Assistance Program

The Project includes a technical assistance program whose primary objective is to help the utilities and EE Suppliers build capacity to develop EE projects with customers and prepare the EE project investments. In addition, TA will be directed towards the partner FI's to develop credit assessment capabilities to execute EE project loans.

The TA program will organize tools applicable over the full project development cycle, with an emphasis on marketing and finance. In this way, the Project will transfer international best practices in EE project development and utility-based EE project marketing, development and finance programs, and accelerate the development of these capacities within participating utilities and EE Suppliers.

The Project will provide TA to EE Suppliers and the utilities' CSC's to generate sub-projects. Then, in turn, these Project actors will be able to deliver TA to end-users to guide them in developing their EE sub-project. Direct cost-sharing of EE project development activities will be provided with GEF and other donor funds; as Project operations proceeds, the cost share will be diminished.

4.10 Appraisal Agenda & Next Steps for Project Preparation

In order to prepare the Project Appraisal Document, IFC will hold additional meetings and work with utilities, EE Suppliers, FIs and other parties. The meetings will serve to gather additional data that can inform Project design, and to develop commitments from initial Project partners.

Meetings with Utilities.

- Complete market research in target service areas
- Develop detailed CSC business plan.
- Gain financial commitments from initial utility partner.
- Finalize cooperation agreement.

Meetings with EE Suppliers Network.

- Identify and conduct assessments of initial set of EE Suppliers and their technologies.

- Interview EE Suppliers to further determine their capacities and willingness to provide forms of credit enhancement.

Meetings with FIs.

- Further assess their security requirements and refine and evaluate equipment finance mechanism and credit enhancement structure options.
- Complete research on integrating collections of EE equipment loan payments together with the utility bills as a credit enhancement mechanism.
- Conduct a procurement of and select the FI partner(s).
- Prepare full business plan for the financing and Guarantee Facility mechanism including financial projections. Negotiate risk sharing terms.
- Complete cooperation agreement with I&G on providing guarantees in cases where the EMC is the borrower.

5 Stakeholder Participation

The Project is designed to engage different stakeholders by building on their own self-interest, taking advantage of their strengths, and making it as simple as possible for them to participate. The Project design itself is the outcome of extensive meetings with stakeholders to date.

5.1 Energy End-users

Types of end-users targeted include industrial, commercial, SME, municipal/institutional, and multi-family residential sector customers seeking to develop, finance and implement EE projects in their facilities.

A typical end-user might be Shijiazhuang Steel Company. The Company is preparing a project to substitute gas for coal in their kiln producing lime for steel manufacture; this project has an estimated 2.5 year payback period and will save considerably on coal processing and kiln equipment maintenance costs, as well as produce a purer lime that will improve the steel quality and reduce waste steel product. This steel company is also considering gas conversions for their steel rolling furnace and has a further (non-gas) heat recovery project under development, all which could benefit from this Project's TA and financing services.

5.2 Utilities

The utility partners will play a market aggregator role, systematically identifying potential sub-projects within a service territory, and offering the end-users EE services, including equipment and finance packages designed to meet typical energy use needs. The introduction of utility hubs into the Chinese EE market can bring about large-scale transactional efficiencies, as the utility can take advantage of its relationships with customers to market EE to them, and can act as a "one-stop shop" to provide easy access to EE engineering and financing. Utility partnerships in establishing financing and implementation facilities, in particular, with gas distribution utilities, are expected to mobilize comprehensive EE modernization projects in end-user facilities.

The importance of gas utilities as agents for implementing comprehensive energy efficiency improvements in the Chinese market is succinctly explained by William Chandler, who conducted assessment of Chinese EE market opportunities for IFC: "For gas to be competitive, gas suppliers must promote efficiency, otherwise the high price of gas makes it uncompetitive with coal. A gas utility is incentivized to package efficiency measures with gas sales in order to penetrate the market."¹³ Thus, there are direct incentives for gas utilities to not only promote gas conversion to increase their loads, but to provide a comprehensive energy efficiency equipment systems package to attract new customers. This self-interest provides an important opportunity for IFC to leverage the marketing efforts of gas utilities to mobilize investment in end-user energy use efficiency which otherwise wouldn't be realized.

IFC has identified Xinao Gas as a potential partner. A natural gas utility, Xinao Gas Holdings, Ltd., (Xinao) operates in over 39 cities serving over 18.5 million people. Xinao's service territory is primarily in middle-size cities in central and eastern China, so the environmental developmental benefits of the Project will reach these populations. Xinao has demonstrated to IFC their willingness and commitment to being an EE market leader, and are prepared to participate in the program. The Project is evaluating additional utilities to participate in the Project, including Wah Sang Gas and Panva Gas. Through its utility marketing and outreach program the Project will continue to evaluate additional utility partners.

¹³ Personal communication, September 29, 2004.

5.3 Equipment Suppliers

Companies who manufacture, sell and deliver EE products and services will have critical roles in marketing, in alliance with the utilities, and in delivering the EE/gas projects and services. They will benefit from increased sales of their products facilitated through the aggregation of customers, enhanced access to finance for EE projects, and the support of their development provided by GEF supported technical assistance for capacity building of these companies.

An example of typical EE equipment supplier is Jiangsu Shuangliang AC Co. Ltd. They supply gas-fired absorption coolers and other large-scale air-conditioning equipment. Their clients (e.g., commercial buildings, hotels, hospitals, airports), have high-volume needs. They have some limited experience with equipment finance, and have provided some financial guarantees to support sales of their equipment.

5.4 Financial Institutions

A commercial bank or banks will be selected to provide debt finance for the EE equipment and projects. While the bank(s) will be the source of liquidity and will administer the loans, a separate Guarantee Facility will take the lead as the primary risk manager in underwriting the loans; this reflects current practices in the Chinese financial market. (See Section 4.7 for more detail). The Project will build EE finance capacities and experience within its partner FIs. The sustainability of the Project will be linked in part to the Project's success in helping the FIs develop sustainable lending businesses for EE projects. IFC has extensive experience in training and capacity building of FIs for EE, SME and environmental finance, including in its Chengdu office, China Project Development Facility, targeting SME capacity building in SW China.

5.5 Local and National Government

The Ministry of Finance, which has endorsed the Project, will be the primary point of contact between the National Government and the Project. The EE Division of the National Development and Reform and Commission, has government responsibility for energy conservation policy and programs, and would be represented on the advisory committee. IFC has already met with them and received their input on Project design. IFC will continue to work with them on a consultative basis, especially to develop a strategies to recruit electric utility partners.

Local governments play an important role in utility oversight and management; they are also involved in establishing market targets and plans for gas distribution utilities, through concession contracts. The Project will therefore coordinate with local officials in its target cities. IFC has already met with local officials in Shijiazhuang, a potential target city.

The Project will not rely on potential policy changes to help create a market, as there are sufficient projects available under current regulatory conditions. However, the Project will identify any policy barriers, e.g., co-generated power utility buyback rates, and will inform the relevant authorities on why the barriers impede the greater uptake of beneficial EE projects, and on how the barriers might be addressed.

5.6 Energy Efficiency or Industry Organizations (NGOs)

NGOs and industry associations currently supporting or implementing EE promotional activities will be engaged in Project implementation, especially in establishing the Network of EE equipment and service providers and in marketing activities. They will also be invited to serve on the Project Advisory Committee.

IFC has met with leading energy efficiency organizations such as the Energy Research Institute, Beijing Energy Conservation Center, the Global Environmental Institute (GEI) to gain their inputs on EE market opportunities and Project design aspects. These organizations will also be invited to participate in the Project Advisory Committee.

5.7 Other Donors

Other donors, mainly bi-lateral agencies, will be sought by IFC to co-finance the complementary TA program. There are many opportunities for technology transfer and business development in China's EE sector for international firms, which bilateral donor agencies frequently seek to promote.

IFC is also in touch with the proposed World Bank/GEF China Heat Reform and Building Energy Efficiency project, the UNDP/GEF China End-Use Energy Efficiency Project, and the French GEF (Fond Francais Pour L'environnement Mondial) which supports several activities around EE in the Chinese building sector. See Section 6.7 for more detail.

5.8 Project Advisory Committee

At inception, the Project will establish a Project Advisory Committee whose members will be recruited to represent all the various Project stakeholders: utilities, end-users (via associations), EE NGOs, relevant Government agencies (concerned with energy, finance, and environment), EE suppliers, local and provincial governments, financial institutions, and other donor-supported EE programs. Each representative will provide a channel for communications with their respective constituencies. All partner utilities and FIs will be represented on the Advisory Committee. The Project Advisory Committee will be chaired by an appointee of the Ministry of Finance and organized by the Project Manager.

The main role of the Advisory Committee will be to provide advice and feedback on the Project design and implementation, in order to support Project operations. The Advisory Committee is also a potential forum for the advancement of EE finance and market development as many of its participants play important roles in promoting and sustaining a favorable policy environment for EE investments. The Advisory Committee will advise the Project PMO on Project strategy and especially specific topics related to dissemination, outreach and replication and coordination with other national initiatives and policies.

The Advisory Committee will be convened approximately annually or semiannually. The first Advisory Committee meeting will be organized after launching the Project. The purpose of the first meeting will be to announce that the Project has started its operation, present Project strategies for the first year and discuss the implementation plan.

The Advisory Committee can also play an advocacy role to support Program implementation by addressing critical EE business related policy and strategy issues at the Government policy and commercial market levels. Beyond the annual Advisory Committee meetings, Program management and implementation team may contact the Committee members to seek advice on issues raised during day to day Program operation.

6 Implementation arrangements

6.1 Project Management Office.

A Project Management Office (PMO) will be established to act as the local implementation body for the Project. PMO staff will be hired as employees of IFC. The PMO will be co-located with IFC's Beijing office and will liaise directly with the Government's Ministry of Finance, International Financial Institution Division (MoF). Because the Project is first and foremost a private-sector finance and marketing program, and because IFC has an established relationship with MoF working on such issues as private sector investment in the financial sector and new financing instruments, the Government has agreed that the MoF shall be IFC's primary point of contact with and reporting to the Government for the Project.

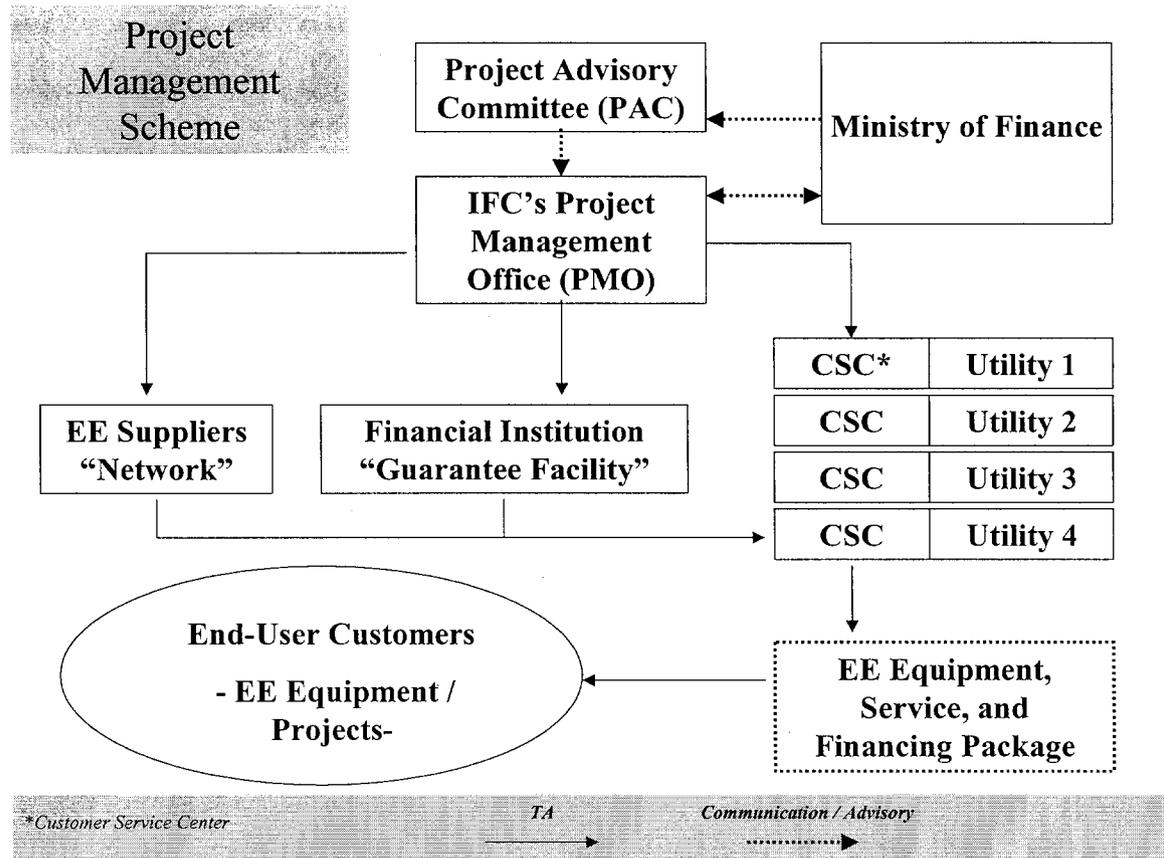
Figure 2 below depicts the Project's Management Scheme. Solid lines indicate direct contractual relationships; dotted lines represent advisory and consultative relationships.

The PMO will play a central role in the Project management. Its functions include the following:

- work with partner utilities to implement the Project, especially during the start-up phase when Project methods are being developed; start-up work will include the establishment of the utility CSC, the EE Suppliers Network, and the guarantee operations;
- procure and manage external consultants -- both national and international -- involved in the TA program, including for Project start-up;
- assist in development and structuring of EE sub-project transactions;
- provide the leadership and hands-on operational guidance to maintain, further develop and adapt the Project's vision and strategy during the start-up and operations period; the PMO will be expected to be particularly responsive to changes in market conditions or to findings of the mid-term process evaluation;
- recruit new utility partners and conduct the outreach program in all its dimensions, including replication of Project methods and start-up of Project operations with subsequent utilities;
- manage other donor funds and provide reports to donors as required;
- organize and implement the monitoring and evaluation of the Project and procure and manage external evaluation consultants;
- coordinate the Project's multiple stakeholders;
- organize and conduct meetings of the Project's Advisory Council;
- liaise with and provide reports to relevant People's Republic of China Ministries;
- prepare reports as required for internal IFC and GEF purposes.

The Project relies on a structured financial instrument working with financial institutions. The technically sophisticated financial structuring aspects of the Project, including loans and guarantees, will require the active support of and close cooperation from the MoF throughout Project development and execution. The MoF further will nominate an official to liaise directly with the PMO and also to chair the Project's Advisory Committee.

Figure 2: CHUEE Project Management Scheme



6.2 Management of GEF Funds

The PMO together with the IFC headquarters will manage the disbursement of the GEF funds for the Project.

6.3 Normal Project Expenditures

GEF funds for normal Project expenditures -- TA, incremental Project operations costs, monitoring and evaluation -- will be disbursed to IFC and then managed and expended by IFC as expenditures are incurred, as per normal practice.

6.4 Guarantee Reserves, Escrow Agreements

GEF funds used as guarantee reserves will be made available for Guarantee Facility operations. The expected implementation arrangement is for IFC to enter into a "guarantee reserve fund escrow agreement" with the financial institution managing the Guarantee Facility. This agreement would pledge and define the use of the IFC/GEF guarantee reserve funds. These funds must be pledged and be readily available to make guarantee claims; this will provide necessary assurances to lending banks of the ability of the Guarantee Facility to pay guarantee claims.

GEF funds for guarantee reserves will be disbursed to IFC. The escrow account fiduciary arrangements for holding and managing these funds will be determined during Project appraisal;

because China's financial regulations restrict IFC's ability to maintain certain types of accounts in China, an off-shore account vehicle is contemplated. Interest earnings on these escrow accounts, net of any fiduciary management fees, will accrue to the Project to be used for Project purposes.

The Guarantee Facility will be operated by financial institution(s), to be selected. A single Guarantee Facility for the whole Project, or several Guarantee Facilities for each utility partner may be established. Final structuring of the Guarantee Facility mechanism, including selection of the financial institution manager(s) and full financial projections for the Guarantee Facility operations, will be completed in Project appraisal.

6.5 Program Term and "Exit Strategy" for GEF Funds

The Project operations period is scheduled for seven years to allow sufficient time to originate EE projects and engage multiple utilities. Many technical assistance activities will be front-end loaded during the first two to three years of this period to support start-up of utility operations and generate project deal flow. The operations period is the "availability period" during which new EE projects will be prepared and loan guarantees originated. Even after new guarantees cease to be issued, the Guarantee Facility must continue to operate until all guarantee liabilities and underlying loans have matured; IFC will assure proper management of all guarantees after completion of the Project operations period.¹⁴

GEF "exit strategy", meaning a plan for final disposition of unexpended GEF guarantee funds, will be developed further in Project appraisal as the structure of the Guarantee Facility is finalized. The first best case exit strategy for GEF guarantee funds is for these funds to be permanently granted to the Guarantee Facility for continuation of guarantee operations. This decision would be made after appropriate evaluation and subject to good performance by the Guarantee Facility and continued demand for the EE loan guarantee product. Other exit strategies can be developed in consultation with the Ministry of Finance. These may include reprogramming of the GEF funds to other climate change activities approved by the Ministry of Finance.

6.6 Utility CSC Operations

Participating utilities will establish their CSC as a headquarters function. The CSC will be the knowledge center to coordinate implementation of the program for the utility, in concert with their local service area marketing departments. Staff for each of these operating units will be trained as part of the Project's start-up support and TA activities. Each utility will enter into Cooperation Agreements with participating EE Suppliers.

6.7 Institutional Coordination and Support

In developing this Project, IFC interviewed officials from the Ministry of Finance, National Development and Reform Commission Energy Efficiency Division, Energy Research Institute, Beijing Energy Conservation Center, and Energy Management Company Association amongst others to review this Project concept and has reviewed related activities of other donor agencies including the GEF and World Bank. In general, donors have only recently shifted their attention to the importance of developing markets and technologies for use of natural gas in China. ADB has conducted one fact-finding mission on this topic (i.e., Beijing-Shanxi gas distribution line),

¹⁴ Please note that IFC's management costs for performing this function are not yet included in the estimates of IFC in-kind contribution to Project management.

but has initiated no projects. GEF sponsored projects include one ongoing project – the *Second Beijing Environment Project* (fuel switching in space heating boilers) – and one recently closed project – *Sichuan Gas Transmission and Distribution Rehabilitation* – with a specific focus on natural gas. Several GEF-sponsored projects on increased end use energy efficiency could similarly have the effect of increasing substitution of natural gas for coal (e.g., in cogeneration projects) but have not focused specifically on leveraging the dynamic of increasing gas usage in order to mobilize additional EE investment that otherwise would not occur – as is the case here. Opportunities exist for coordination in particular with the prior World Bank program on coal-to-gas boiler conversions in Beijing, which can offer insights into gas market and economics, particular for the boilers market,

Special opportunities for coordination exist with the on-going World Bank GEF Energy Conservation Phase II Project, which promotes energy management companies (EMCs) and notably includes a loan guarantee program supporting loans to EMCs. First, implementing EE involves a wide variety of possible equipment; hence the EMCs which have been developing in China with leadership and support of the World Bank Energy Conservation Phase II Project could be involved in developing and implementing projects. A range of EE projects, including, for example, gas-fired air conditioning have been implemented by EMCs participating in the WB program. The EMCs would work with and be promoted by the partner utility, which could help develop customer relationships and project leads and feasibility studies that lead to EMC projects.

Second, the WB Phase II guarantee program offers valuable prior experience. China National Investment & Guarantee Company Ltd. (I&G) is the Guarantor for this program and may be able to provide loan guarantees in cases where, under this Project, sub-projects are implemented using loans to EMCs. Note that this program only provides guarantees on loans where the EMC is the borrower and does *not* provide guarantees on EE project loans made to end-users. The Project is designed to support both loans to customers and loans to equipment suppliers and contractors who have long-term energy services contracts with customers. When the latter structure is used, it may be possible to work cooperatively with I&G. Discussions with the World Bank regarding these possibilities are underway and will be broached with I&G during Project appraisal.

IFC is also in contact with staff for the UNDP/GEF China End-Use Energy Efficiency Project. Several areas of potential cooperation between our two projects. First, the UNDP project will be developing standards and labels for the cement and petrochemicals industries. To the extent that the Project works end-users in the UNDP's target industries, the Project will take note of those standards and promote and incorporate them into the EE packages we prepare. Second, the UNDP project will support Voluntary Agreements for EE within the chemical and cement industries; if there is geographic overlap, the Project could help industries targeted by UNDP to finance EE investments. The UNDP projects pilot cities are Beijing, Shanghai, Chongqing, and Shenzhen. Finally, the UNDP project has an activity entitled "Policy Development on EE Financing Options." Thus, as the Project proceeds in implementation, the two projects can share information, experience and methods regarding EE finance.

Staff for these and other relevant GEF and donor projects will be further consulted during preparation and operations of this Project, and opportunities to collaborate with their programs will be explored.

6.8 IFC's Comparative Advantage

IFC was specifically asked by the PRC Ministry of Finance to develop a new private sector RE and/or EE finance initiative in China. IFC has actively coordinated the development and design of

this Project with the PRC Ministry of Finance and GEF Focal Point from its inception. IFC has a proven track record cooperating with the Chinese government, and specifically the Ministry of Finance, in establishing and operating new innovative project offices. IFC successfully established the SME TA facility China Project Development Facility (CPDF) in Chengdu in 2001, which is one of the few satellite project offices operated independently by a multilateral institution. CPDF is committed to provide management, personnel and administrative support to the Project and a critical link to donor fund-raising.

Since 1985, IFC has made over 70 private sector investments in China totaling \$1.2 billion for its own account and an additional \$542 million in syndications. Investments include financial institutions, heavy industry such as cement, chemicals and automotive companies, manufacturing, energy utilities and power projects, and private equity funds. The pace of investment has been accelerating; from 2002 to present total IFC investments exceed \$600 million. Further, IFC has undertaken several technical assistance programs and distributed tens of millions of dollars in technical assistance funds, notably targeting SME business development and improving access to finance for SMEs through CPDF. IFC offices in Beijing, Chengdu and Hong Kong, have over 150 local and expatriate professional staff. IFC has a proven track record of effectively selecting, evaluating and implementing successful development projects throughout China. The Project, lead by IFC's Environmental Finance Group, is tapping this knowledge base. Mainstream IFC investment departments and legal departments are sharing expertise and contacts to facilitate Project development.

Through its experience with HEECP, CEEF, ELI and other EE finance and market development programs supported by the GEF and other donors, IFC has developed a good understanding of how to structure and operate guarantee schemes to stimulate increased investment in energy efficiency. This Project will build on the technology, procedures, and know-how from the current portfolio of IFC GEF-supported programs. Further, IFC has extensive investment experience in distribution utilities, including in a gas utility in China.

The development of solid local financial institutions and promotion of investments with sound environmental benefits is an integral part of IFC's overall strategy. IFC will seek opportunities to replicate Project methods within its portfolio of distribution utility investments in other countries.

IFC has an established track record in the Chinese financial sector investing over US \$200 million dollars in commercial banks (debt and equity), and over \$250 million dollars in other financial markets companies such as insurance, mortgage, distressed assets, credit rating, investment banking, asset management and private equity. IFC works closely with the Ministry of Finance in developing new financial instruments, and thus is well positioned to work with the government to resolve any legal, policy and regulatory issues pertaining to the structuring of a guarantee facility.

7 Project Budget, Financial Modalities, Financial Plan and Cost Effectiveness

7.1 Project Budget & Use of GEF Funds.

The Project's budget is divided into the following seven categories:

1. Start-up, Technical Assistance & Incremental Operations Costs : Utility Customer Service Centers (CSC) and Guarantee Facility
2. Technical Assistance: Developing EE Projects for Customers
3. Outreach Program to Utilities
4. Incremental Project Management Costs
5. Guarantee Reserves
6. Monitoring & Evaluation
7. Capital Costs for Implementation of EE Projects

No GEF funds will be allocated to capital costs of EE project equipment and installation; some GEF funds will be used to co-finance sub-project development costs.

Explanation for each budget category is provided below and covers use of GEF funds and related co-financing, by source. The budget and estimated use of GEF funds and full estimated Project budget including all co-financing are provided as Tables D-1 and D-3, respectively. These budgets are estimates; IFC may reprogram funds as needed to adapt to market conditions.

7.2 Establishment of Utility Customer Service Centers, of EE Suppliers Network, and of Guarantee Facility

7.2.1 *Utility Customer Service Centers*

The Project will work with participating utilities to develop and start up their CSC. Each utility's CSC staff and related marketing staff will be trained to perform their functions.

Partner utilities will be required to make significant in-kind contributions in staff and support services to both the CSC and guarantee operations. Both these contributions are valued in the overall Project budget at approximately \$200,000 per operating year. Utilities are also expected to provide some capital for Guarantee Facility reserves. Further work to detail the operations costs associated with CSC and Guarantee Facility operations will be done during Project appraisal.

Replication with up to four utilities is budgeted. The work with the initial utility partner will develop methods that can be applied, adapted and replicated with subsequent utility partners. Thus, the budget for establishing the initial CSC is higher. Table D-5 estimates the number of years in aggregate which participating utilities will operate their CSC programs. A total of 16 utility operating years is estimated. This value is used to estimate the value of the utilities' in-kind contributions to operate the CSCs.

International and national consultants as well as PMO staff will be engaged to provide necessary TA to participating utilities during their start-up and operations periods. It is expected that donors will be interested in replicating the model of delivery of EE improvements through a gas utility. . Therefore the budget assumes that replication among other utilities will be co-funded with donor funds

7.2.2 *EE Suppliers Network*

Each CSC will receive TA to establish the EE Suppliers Network, and to train EE Suppliers in marketing, contracting and finance methods used by the Project.

7.2.3 *Guarantee Facility*

Budget for start-up of and a portion of incremental operations costs for the Guarantee Facility to work with each utility is included. Replication with up to four utilities is budgeted. Again, the work with the initial utility partner will develop methods that can be applied, adapted and replicated with subsequent utility partners. Thus, the budget for establishing the initial Guarantee Facility is disproportionately higher.

7.3 Technical Assistance: Developing EE Sub-Projects with Customers

Developing EE sub-projects with customers requires work through the full project cycle, from marketing, to audits, to full engineering and project investment planning. These functions will be managed by the utility's CSC, which will use its own staff and contracted engineers for these functions. Utilities will pay for their own staff costs; the estimated value of this contribution is \$100,000 per operating year.

GEF funds will be available to cover a portion of the direct costs of sub-project development, including audits and engineering.

Donor co-financing will also be used for developing sub-projects. If necessary, tied bilateral funds can easily be applied, as engineering skills are widely available. Further, this category represents good opportunities for countries to support exports of their equipment. Thus, this is a good category of Project expenditure for which to raise donor co-financing.

Table D-4 provides an estimated budget breakdown of sub-project development costs through key stages of the sub-project development cycle: marketing, audit, engineering and investment planning. Four categories of sub-projects are indicated, broken down by average size:

- “small” projects, with average size of \$250,000
- “medium” projects, with average size of \$1,000,000
- “large” projects, with average size of \$2,000,000
- “very large” projects, with average size of > \$4,000,000.

This same breakdown of sub-project sizes is used to construct a hypothetical portfolio of sub-projects and for sizing the finance and guarantee mechanism; (see below, Section 7.7 and Table D-5).

The Project will pay for only a portion of sub-project development costs; the balance of these costs will be paid by the customer directly or by the EE Supplier. Customer payment for sub-project development costs can be made either at each stage of sub-project development, or reimbursed to the Project (CSC) contingent on and at the financial closing for the sub-project.

The Project's goal is to promote development of sub-projects through marketing and audits, but then allow the customers and other commercial parties to pay for the balance of sub-project development costs themselves, as the sub-projects are economic and commercially viable on their own without Project subsidy. Therefore, in general, the Project will pay for: 100% of marketing costs; a high portion (75-100%) of audit costs; and, a lesser share, e.g., 0-50% of subsequent full project engineering and investment planning development costs.

7.4 Outreach to Utilities

The Outreach program has three main components:

- identifying and recruiting new gas and electric utility partners,

- disseminating Project methods, i.e., sharing a broad set of educational and promotional activities and
- training select utilities on Project methods, which is a more intensive activity with motivated utilities interested in implementing one or more Project methods.

Most outreach activities will be performed by PMO staff. Therefore, the budget for dissemination and training activities are estimated at \$150,000 each and are for direct incremental costs for items like workshops, trainers, printing, mailings, etc. These budgets will be supplemented by donor co-financing.

A key tool for recruiting electric utilities will be performing cost/benefit analysis of EE/DSM measures and estimating electric system benefits to the given utility. Because of the important demonstration value of recruiting an electric utility, \$200,000 is budgeted for this activity. This work will be contracted to qualified experts.

7.5 Project Management Costs

IFC will establish and staff a Project Management Office (PMO) for the Project, based in Beijing and co-located with IFC's Beijing office. Staffing for the PMO is expected to include a highly qualified Project Manager with a marketing and business background and technical knowledge, a Financial Analyst, and a Project Assistant. A budget for six years of operations is included.

IFC will also provide in-kind operation cost support in several key ways. First will be professional staff contributions from Legal Department and relevant mainstream investment Departments: Financial Markets, Infrastructure, General Manufacturing, and SMEs. These staff have already provided assistance to development of the Project and are available to continue to do so during Project operations. Further, the IFC Beijing office will house the Project PMO, provide office, meeting and conference space and certain office support. The value of all this support taken together is estimated at \$750,000 over six years. Finally, IFC will cover the cost of overseeing the administration of the guarantees still outstanding at the close of the Project. As the maximum loan time is expected to be five years, this activity can be expected to continue for up to five years after new guarantees cease to be made.

Full financial projections for the Project and its various units -- PMO, CSC, and Guarantee Facility -- will be prepared during Project appraisal.

7.6 Monitoring & Evaluation

All monitoring and evaluation costs will be paid from GEF funds. Monitoring and evaluation will be conducted by independent external consultants procured and managed by IFC's Environmental Finance Group (EFG) and the PMO. Mid-term, final and post-project evaluations are planned. Information on the energy savings performance of the EE sub-projects will be gathered by the sub-project participants, including the utility, EE Supplier and customer; protocols and training to gather this data will be included in the training agenda. Extra commercial costs associated with gathering this data will be paid by the Project GEF funds.

7.7 Financial Plan for EE Project Guarantee and Financing Mechanisms

The GEF budget for guarantee reserves, the co-financing of guarantee reserves, and the amount of EE sub-projects that can be financed with the given budget are all estimated based on assumptions about the financing and guarantee mechanisms and associated terms. These assumptions are detailed in Tables D-5 and D-6, and are explained below.

Hypothetical Portfolio. A hypothetical portfolio of EE sub-projects is illustrated in Table D-5; explanation of key points from Table D-5 follow.

- Types of EE sub-projects are broken down by average size, as described above.
- Loans are expected to cover 75% of total project costs; the balance will be contributed by the customer (or an EMC, if applicable) as a down payment or equity contribution.
- Overall, the average loan size is \$500,000 equivalent.
- The total loan portfolio consists of 180 project loans, broken down as indicated, with a total loan portfolio supported of \$90 million in loans.
- No loans will be supported for the very large projects, as these would represent too great a concentration of credit risk for a single transaction. In practice, partial credit guarantees of some small fraction may be applied to the very large project loans.

7.8 Guarantee Reserves & Implementation of EE Sub-Projects

The guarantee mechanism, including budget for guarantee reserves and calculation of total EE projects and loans the guarantee can support, is illustrated in Table D-6. The values in this table are consistent with the hypothetical portfolio. Explanation for key assumptions in Table D-6 is as follows.

- As with the hypothetical portfolio, the average loan size = \$500,000 equivalent, for a total portfolio of 180 projects and \$90 million in total loans.
- The amount of guarantee reserves required to support this amount of lending is calculated with a maximum “guarantee ratio” of 5:1; that is, a minimum of one dollar equivalent of guarantee reserves is required for every five dollars equivalent of loan principal outstanding. This implies that the guarantee reserves will fully cover all guarantee claims up to a default rate of 20%; this is the “planned default rate”. The actual default rate is estimated to be closer to 5%; this estimate will be refined during Project appraisal.
- The guarantee percentage is expected to be 90%; this value is consistent with current China market practices.
- Thus, to support a \$90 million loan portfolio, a total of \$16.2 million in guarantee reserves is required.
- Contributions to the guarantee reserves are expected from several sources indicated: GEF, utility, EE Supplier and customer. The utility contribution may take two forms: initial capital contribution to the guarantee operations, and contributions per project transaction. EE Supplier contributions are expected to be charged as a fee to the EE Supplier, which fee will be recovered by them in their price. IFC anticipates that this fee will be commercially acceptable to the EE Supplier because they directly benefit from the financing through making their equipment sales. These customers will also pay guarantee fees. Further refinement and variations of these charges will be made during Project appraisal and operations.
- In addition to the guarantee, other credit enhancement mechanisms will be used, including, potentially: “lien-at-the-meter” provision whereby loan payment collections is integrated with utility bill collections and utility service can be cut in event of non-payment; additional limited recourse from EE Suppliers (beyond the fees indicated above); and, a back-up guarantee from the utility.

The maximum guarantee ratio -- which is the maximum amount of loans that can be supported for every dollar equivalent in guarantee reserves -- must be determined in consultation with FI partners. While the 5:1 ratio is a reasonable value, it may have to be lower to meet the security requirements of local FIs. In this case, the amount of EE loans the Project could support would be

reduced. Negotiation of this and other parameters of the financing mechanism will occur during Project appraisal.

In practice, the Project should have capacity to support more than \$90 million in sub-project loans for the following reasons. First, the guarantee funds will revolve; that is, the loan tenors will likely be in the three to five year range, so, as outstanding principal is repaid on the loans, this will free guarantee capacity to make further subsequent loans during the Project's seven year operations period. Second, over time, with successful loan repayment performance, the utility may be willing to support, and the lending banks may be willing to make, loans with a lower level of guarantee reserves. This would increase the guarantee ratio (guarantee reserves to loans) and would allow given level of reserves to support a greater amount of lending.

7.9 Co-Financing and Leveraged Resources

Project participants -- utilities, EE Suppliers, FI's and end-users -- will each contribute directly to Project costs in several forms: guarantee capital, debt financing, equity funding and end-user fees.

IFC, through its bilateral Trust Funds, Private Enterprise Partnership program and other sources, will seek contributions of additional technical assistance funds to the Project. Additional co-financing for Project operations, including especially marketing and development of EE sub-projects, will be sought from EE equipment suppliers, the participating utilities and the bank partner(s). These values and their estimated uses are specified in Annex D-3.

Those costs which directly fund EE sub-project implementation -- namely an estimated \$90 million in commercial bank debt financing and \$30 million in project sponsor equity investments -- are calculated as part of the co-financing package¹⁵; these co-financing funds will be mobilized during Project operations as EE sub-projects are developed and implemented.

"Leveraged resources" are defined as "...additional resources -- beyond those committed to the Project itself ... that are mobilized later as a direct result of the Project, e.g. for further replication or through programmatic influence."¹⁶ The initial set of participating utilities are expected to replicate Project methods in other service areas of their utility without full Project financial support. Also, the Project plan includes an outreach program to educate and train utilities on Project methods, so that they can replicate them themselves without the levels of Project financial support which the initial set of utilities will receive. Thus, IFC believes it is reasonable to expect replication through the Project's influence, market development and demonstration effects, and, therefore, for related additional resources to be mobilized. Assuming replication in three to four additional service areas of participating utilities and replication in two additional new utilities, these additional "leveraged resources" are estimated to be in the range of \$60 million; this is deemed a conservative estimate. This value is listed in the Executive Summary under "leveraged resources". These impacts will be tracked and estimated as part of the Project Monitoring and Evaluation program. (See Section 10 and Annex E.)

¹⁵ Consistent with definition of co-financing in Annex C: Co-financing Policy for GEF Projects, http://thegef.org/Operational_Policies/Eligibility_Criteria/templates.html.

¹⁶ *ibid.*

7.10 Project Cost Effectiveness and Estimation of GHG Emissions Reductions to be Achieved by the Project

Project cost-effectiveness is measured by the amount of GEF expenditures per ton of CO2 equivalent GHG emissions reduction achieved by EE sub-projects directly supported by the Project.

Based on the hypothetical sub-project portfolio illustrated in Table D-5, IFC estimates a total of 4.81 - 9.63 million metric tons of CO2 equivalent emission reductions will be achieved by sub-projects directly supported by the Project. These calculations do not include further emissions reductions achieved by additional sub-projects indirectly supported by the Project, e.g., through outreach program, or implemented by virtue of the Project's demonstration and market transformation effects.

7.11 Net GEF Expenditures & Cost Effectiveness Calculation.

Because most GEF funds for this Project are budgeted to support the credit enhancement mechanism, final Project GEF expenditures will be a function of sub-project loan collections performance. The estimated default rate on the loan portfolio is 5%. If the actual default rate is 5%, then, given the financial plan and mechanism indicated above, GEF expenditures for guarantee claims would be \$4.35 million. The maximum GEF expenditure for guarantee claims would be \$12.125 million. Table 2 illustrates the GEF cost-effectiveness calculation based on these two varying levels of GEF guarantee expenditures and the range of GHG emissions reductions estimates and indicate a GEF cost per ton of CO2 avoided of between \$0.77 and \$2.17. Please see Annex A for further explanation of these calculations.

Table 2: GEF Cost-effectiveness Calculations

GEF Cost-effectiveness Calculations	Case #1	Case #2	Case #3	Case #4
Total EE Sub-projects implemented	\$120,000,000	\$120,000,000	\$60,000,000	\$60,000,000
GEF expenditures, excluding Guarantee Reserves	\$4,350,000	\$4,350,000	\$4,350,000	\$4,350,000
Actual default rate	5.00%	20.00%	5.00%	20.00%
GEF Guarantee Reserve expenditures	\$3,037,500	\$12,150,000	\$1,518,750	\$6,075,000
Total GEF Expenditures	\$7,387,500	\$16,500,000	\$5,868,750	\$10,425,000
Tons CO2 emissions avoided by Project, est.	9,625,000	9,625,000	4,812,500	4,812,500
GEF cost per metric ton CO2	\$0.77	\$1.71	\$1.22	\$2.17

7.12 How the Project Uses Competition

The Project will use competitive commercial methods in many ways to assure the best use of GEF funds and commercially sound and attractive project transactions for all parties. Utility partners, following the initial partner, will be solicited on a competitive basis. EE Suppliers will be solicited and procured on a competitive basis. Lending banks can be solicited on a competitive basis, both to participate in general and to offer financing for specific individual sub-project loans. Consultants will be procured both on a competitive and negotiated sole source basis, as appropriate, to source necessary skills for Project implementation.

8 Sustainability and Replication

8.1 Sustainability

Gas utilities are naturally highly motivated to undertake this Project insofar as they can be shown that it offers a means to build gas loads and increase sales. IFC will select partners and design the TA so as to ensure that the Project's infrastructure will become part of mainstream market operations. The CSC will be designed to become a permanent feature of partner utilities' operations, and to be able to implement transactions on commercial terms. IFC expects utility partners to devote considerable resources to this Project, including in-kind senior management and staff resources during Project development and implementation, marketing activities, and direct cash support for the credit enhancement guarantee or other program components. That commitment will be a precondition for gas company participation in the Project, and a major criterion in the selection of utility partners.

IFC's experience with other financial guarantee programs, such as HEECP or CEEF, has shown that a GEF-backed financial guarantee can be an effective tool to introduce EE lending practices into a national market. IFC expects the Project's credit enhancement mechanism to be co-funded by the participating commercial parties, including the utilities, the EE/gas equipment suppliers, and end-user/borrowers. Loan financing will be provided by the local FI partner(s) on normal commercial terms, supported by whatever credit enhancement support is found to be necessary. The EE/gas projects themselves are expected to be economic for the end-users, or otherwise motivated by requirements to comply with environmental regulations.

8.2 Replication – Overview.

The Project is in part a market transformation project, addressing GEF Strategic Priority CC-1, *Transformation of Markets for High Volume Products and Processes*. Replication is central to the design concept of any market transformation program, because these programs rely on replication to enlarge their sphere of influence from selected transactions to entire markets.

As befits a market transformation program, CHUEE is intended to catalyze far-reaching change in Chinese EE markets, at several levels: within an industry sector, through increased activities by equipment suppliers, within a utility's service territory, among non-participating utilities, and, through IFC's Infrastructure Department, in other countries.

8.3 Replication within Industry Sectors

In industries where EE affects competitiveness, it is reasonable to expect that as a few industry leaders increase the efficiency of their equipment, others will follow.

This is particularly true in the case of gas-based projects. Gas is a high-quality fuel. Its combustion is reliable and easily controlled, and remains so even at a low load factors. Even when gas equipment is not operating at peak load, its output remains efficient and steady for a range of part load conditions. These qualities of gas appeal to industries where loads vary and product quality depends on a steady supply of heat. For example, manufacturers of glass for screens can lower the number of rejects by using gas-fired ovens, steel manufacturers can improve quality and reduce waste by using gas-fired kilns to produce lime for steel manufacture. Affected industries include glass, pharmaceuticals, food processing, and electronics.

The Project will undertake several activities to facilitate replication within an industry sector. The Project will target industrial end-use partners across a range of industries, rather than

concentrating in one or two industries. The Project will also prepare industry-specific brochures and seminars. Finally, the Project will work together with industry association to disseminate EE information.

8.4 Replication Through EE Equipment Suppliers

The Project will organize a Network of EE equipment suppliers and service providers to offer packages of EE measures integrated by the utility. Equipment suppliers are highly motivated to increase market penetration on a national scale. The Project will thus seek to leverage this interest by building the capacities of equipment suppliers to market and offer financing for their equipment. Such a collaboration with equipment suppliers can be an important element of the strategy for replicating the model throughout the country.

8.5 Replication Within a Utility

China's gas utilities have vast service territories. For example, Xinao operates in over 39 cities with a population of over 18 million. Regardless of which utilities the Project works with, it will not be able to work within the company's entire service territory. The Project, in consultation with the utility partner, will select several service territories as priority markets, based on the size of the potential EE markets, presence of local finance partners, availability of high-quality equipment, and the capacity of local partners.

The economic rationale for a gas utility to conduct customer-side equipment finance and EE programs is compelling. Equipment efficiency is a key component of the economics of a new gas installation, so EE should become part of a gas utility's sales pitch as it seeks to expand its customer base. It is reasonable to assume that once the gas utility will have gained experience with EE through the Project, that it will integrate EE into its business development strategy.

The Project will do its utmost to facilitate transfer of EE activities throughout the service territories of its partner utilities. A wide geographical service territory is one of the criteria which the Project will use in selecting its utility partners. Software, manuals, databases and other tools developed with partner utilities will be designed to be easily transferable from one service territory to another; these capacities will remain in the China market. The Project will also conduct "train the trainer" events to empower managers within one CSC to impart their know-how to other branches of the utility.

8.6 Replication Among Non-participating Utilities

The Project resources will cover the establishment of direct partnerships with up to four Chinese utilities. Additional targeted utilities for the utility marketing and outreach program include Wang Sah Gas and Panva Gas. Outreach to other utilities is an integral part of the Project's mission, as illustrated by item Three in the budget, "Outreach to Utilities". The Project will hold meetings in industrial areas of China, to introduce the concept of the utility as market aggregator for EE, to share examples of win-win sub-projects for both gas and electric utilities, and to introduce the tools developed under the Project. In follow-up events, the Project will offer training to interested utility staff on using the project tools – databases, manuals, software.

It is possible that one or more partner utility sets up a subsidiary that offers other utilities its services as an EE market aggregator. This approach would effectively enable non-participating utilities to outsource their CSC to partner utilities. One such market niche would be for a partner utility to outsource the services of its CSC to a municipal utility that does not have the resources or mandate to undertake private-sector-based EE projects on its own.

8.7 Replication in Other Countries

IFC views this Project as a very important incubator to test, prove, and draw lessons from the use of gas utilities to systematically deliver EE to end-users in their service territories. Assuming the Project performs well, IFC's Infrastructure Department is prepared to mainstream its methods with other IFC portfolio gas and electric distribution utility companies as well.

The Project itself is a larger-scale replication of a concept being developed on a smaller scale in Egypt, under the IFC/GEF Environmental Business Finance Program. Egyptian FIs would finance EE improvements for SME customers of a partner gas utility. GEF resources would be used for TA and credit enhancement. IFC's Infrastructure Department is following the Egypt and China projects quite closely.

IFC's Infrastructure Department has a portfolio of gas distribution company investments whose sponsors would be natural partners for replicating the Project model. Environmental sustainability is a priority for the Infrastructure Department, and the Project model offers a way to integrate energy efficiency concerns into the expansion of the gas market. Therefore, the Director of the Infrastructure Department has committed to using experience gathered through GEF projects to mainstream, within IFC's gas sector investment strategy, the approach demonstrated in the Project. This would enable IFC to roll out a sustainability-focused financial product that will leverage large-scale end-user EE investment as an integral part of the expansion of natural gas utilities. The potential for replicating the Project model in other countries is therefore quite significant, as IFC has investments in gas utilities throughout its client regions.

IFC has already demonstrated effective mainstreaming of financial products developed through partnership with GEF in the HEECP, CEEF and the Russia Sustainable Energy Project. In these cases, GEF leveraged substantial IFC investment in energy efficiency; additionally, the investment models piloted in these specialized facilities have been replicated in new products being disseminated (without GEF support) in other markets. On the basis of experience gained through GEF projects, IFC established a Financial Markets Sustainability Group, which now has 25 staff-members and implements mainstream EE (and biodiversity) lending. IFC's current efforts to roll out innovative energy efficiency finance products targeting the housing sectors in Latin America are also direct result of the housing products developed for and piloted in Hungary through the IFC/GEF HEECP program. (See also discussion under Section 6, Implementation Arrangements.)

9 Risk Management

The risk of developing an adequate EE finance deal pipeline is probably the greatest risk associated with the Project. The Project's design anticipates and reflects this risk by providing training on marketing and sub-project development for participating utilities and EE Suppliers. In addition, the utility partnership will enable the Project to systematically identify potential projects in a given service territory. The pipeline risk will also be mitigated by establishing business relationships with a diversified set of utility partners and EE Suppliers, and by developing a diversified set of EE market niche activities.

An additional key risk associated with implementation success concerns finding, retaining and training quality staff and managers in key positions in the CSCs, Guarantee Facility and PMO. This task is one focus of Project appraisal and start-up activities.

It is always possible that significant changes occur in the market, which then threaten the Project. IFC can draw upon its experience with HEECP, CEEF, and the Russia EE Project, and with other credit enhancement projects and EE investments in order to respond nimbly to unforeseen market changes.

Principal risks and issues associated with this Project are discussed in Table 3 below.

Table 3: Summary of Project Risks and Mitigating Factors

Type of risk	Mitigating factors
Non-Project risks	
Policy risk	
National and local environmental policy and efforts to reduce air pollution provide an incentive for EE sales. Changes in environmental policy, or, more likely, lax enforcement due to high costs, will affect the demand for EE equipment.	Further enforcement of environmental policies, even in medium size cities, appears to be a priority for Chinese officials. This Project will provide tools and delivery mechanisms to help them accomplish their goals.
Economic risks	
Financial regulators in China are attempting to "cool down" the economy by restricting lending; this and other macro-economic factors could negatively affect the lending environment. Changes in macro-economic policy and/or conditions could adversely affect the Project. For example, lending restrictions could reduce the tenor of loans available to the Project's target borrowers. Or, reduced rates of economic growth could reduce the demand for capital investment of all kinds.	The Project will select quality implementation partners with financial strength, skilled management, and ability to respond to changing market conditions. Project mechanisms will also be designed to be adaptive to market demands. Market interest rates are still in a range to be attractive to borrowers.
Devaluation of the Dollar against the Yuan	
The Yuan will likely appreciate during the Project operations period, increasing the dollar value of Project operations costs and reducing the Yuan value of dollar denominated GEF funds, including guarantee reserves.	IFC will consider some currency conversion and/or hedging strategies to mitigate this risk. IFC can also have flexibility to reprogram use of GEF funds to compensate.

Project related risks	
Credit Structure and Financial Institution Partner	
A key challenge for the Project design is to complete structuring of the credit enhancement mechanism consistent with China's financial regulation and bank security requirements. Banks are typically requiring 80-90% guarantees to make loans to commercial and SME customers, especially for smaller equipment finance transactions. Several alternative credit enhancement structures are being explored.	IFC has deep relationships with FIs in China from its investing activities. Lower guarantee ratios can be used in early stages of Project operations and then increased with experience. IFC has a multi-tiered strategy for creating creditworthy EE loan transactions, including not only the GEF supported credit enhancement mechanisms, but also other credit structuring techniques; (see Annex A for brief description). The credit enhancement mechanism will use resources from other commercial parties including the utilities and EE Suppliers.
Loan Performance	
There is a risk associated with the payment performance of loans supported by the Project, and defaults/losses associated with these loans. Higher loan loss rates will increase the effective costs of the Project. Loan payment could be poor and loss/default rates higher than estimated, and/or moral hazards associated with guarantees could materialize, leading to higher than estimated loan default rates, leading to a reduction or lack of lending.	The Project, through its credit enhancement mechanism, will provide technical assistance in loan structuring to reduce defaults. Further, EE equipment, while having low collateral value, is essential to the customers' operations, which enhances willingness to pay, and saves in operating costs, which enhances ability to pay. Mortgages on the EE equipment will be obtained as part of loan security.
Underperformance of selected technologies	
The chosen technology will not provide the expected savings, or will require additional financing.	<ul style="list-style-type: none"> • A set of standard equipment packages will be developed to meet typical application needs. Regular data reporting will allow the Project to track equipment performance. Any underperformance can be quickly identified and remediated. • TA program provides technical appraisal support for projects with important technology performance issues.
Poor economics for gas-using projects	
Gas prices are high relative to coal, which constrains the demand for gas and related gas-using equipment. A significant portion of the gas market is driven by national and local environmental policy and efforts to reduce air pollution. Changes in environmental policy, or, more likely, lax enforcement due to high costs, will delay energy market penetration by gas and affect the demand for gas equipment, impacting the program.	IFC has identified a number of gas-using projects which are economic now. Comprehensive EE projects are very economic in China and will be developed in tandem with gas-using projects; this combination will improve the overall economics of EE/gas projects for the end-users. Gas-using equipment also generates other economic benefits, such as improved product quality for certain industries. Environmental regulation as a market driver will not be relied upon, but it is expected to continue.
Implementation Partner	

<p>Chinese utilities have limited experience with marketing on the customer side of the meter. A great deal of work and planning is needed to create an effective Customer Service Center and related marketing program.</p>	<p>A potential initial partner, Xinao Gas, is very motivated to undertake this Project; and additional utility partners will be selected through the planned outreach program. IFC will assist in preparing the detailed strategy and plans for the Customer Service Centers for all participating partner utilities. Project marketing will also occur via the EE equipment suppliers, so multiple marketing channels will be used. IFC will retain an active role managing the TA program and overseeing implementation by the utilities, so on-going guidance to the utilities will be provided</p>
<p>Sub-project deal-flow</p>	
<p>A primary concern for an EE finance Project of this nature is development of a sufficient volume of equipment and project financings to meet Project targets. End-users may find means to finance equipment without loans or otherwise the finance terms offered by participating FIs may not be sufficiently attractive for potential borrowers to utilize the Project.</p>	<p>The Project will support development of EE sub-projects through its technical assistance program even if customers do not use the Project's financing mechanisms. Further, the financing mechanism will be adapted to market conditions and demands during Project operations.</p>

The monitoring and evaluation (M&E) will be designed as a participatory process integral to the Project's implementation. A Process Evaluation will assess the Project's progress and test key assumptions in the Project design; an Impact Evaluation will determine the Project's direct and indirect impacts on its target markets and on greenhouse gas emissions reductions. The M&E will enable capacity-building on EE technologies and project economics, fine-tuning of the standard EE packages prepared for end-users, and rapid understanding and application of lessons learned during the course of the Project's operations. Thus, the Project's M&E framework will serve several purposes:

- monitor progress towards Project objectives;
- strengthen Project performance and management by providing feedback on implementation;
- provide a base for technical and financial accountability.

The M&E will evaluate the Project's direct impact: total EE projects supported by the Project and their related GHG emissions reductions. Other key indicators measures of direct Project performance and impacts are listed below.

In order to capture market transformation effects, the M&E will also assess the Project's indirect impacts and demonstration effects. To this end, the Project will also periodically visit non-participating utilities, equipment suppliers, and financial institutions so as to get a sense of the evolution of energy efficiency activity taking place outside of the Project.

Building on the Log Frame (see Annex B), the M&E plan will identify appropriate indicators to assess the Project's financial/business, energy, and environmental outputs, as well as its outcomes.

The M&E process will promote stakeholder ownership of the Project by directly involving program participants: CHUEE participants will monitor the sub-project performance using data collection tools and will be interviewed regularly as an integral part of the M&E process. Additional data will come from implementation team records and from research by third parties. IFC will employ a third party M&E contractor to provide independent verification, analysis and reporting of findings.

The key M&E deliverables are:

- Data collection tools, and training on using them
- Baseline data
- Annual feedback to management
- Midterm process evaluation during the third year of operation
- Final process and impact evaluation (including direct and indirect impacts) at Project close
- Post-project evaluation

Key performance indicators that will be measured and assessed include the following.

For EE Sub-Projects and End-users

- Number of EE projects implemented and financed with direct Project support
- Total value of EE investments supported

- Total number of end-users engaged at each stage of the sub-project development cycle: marketing, audit, project development, and project implementation
- Energy saved and GHG emissions avoided due to EE projects directly supported

For Utilities and CSC operations

- Demonstration of the utility-based EE project delivery mechanisms for a range of end-user sectors and EE project types
- Establishment of CSCs as on-going business units of the utilities
- market penetration and success rates within target utility service areas
- replication of Project methods through partner utilities' service areas
- # of utilities engaged directly as implementing partners
- participation by an electric utility
- # of utilities trained
- # of utilities adopting Project methods without direct Project financial support

For the EE Suppliers network

- sales volume of EE projects and services by participating EE suppliers
- # of participating EE supplier companies and their improved business performance
- range of EE equipment and services offered
- training of EE suppliers in new marketing and equipment finance methods and adoption of these methods

for Financial Institutions and Guarantee Facility Operations

- Total value of loans supported
- # of EE project loan transactions
- extended loan tenors to 3+ years
- Payment performance of guaranteed loans
- Actual losses incurred and guarantee claims payments made.
- Increase in the "guarantee ratio" (guarantee reserves to total loans guaranteed)
- Reduction in level of credit enhancement needed over time
- Total value of loans provided by banks without credit enhancement
- # of financial institutions participating
- successful Guarantee Facility operations; Guarantee Facility operations established as a going concern

Key market development and transformation objectives to be assessed include the following. The Project seeks to:

- (i) promote the entry of new EE technology into the Chinese market, including efficient gas-using technologies;
- (ii) promote the growth and business development of EE project, equipment and service companies in China;
- (iii) build the capacities and experience of local financial institutions in EE project finance, provide more favorable credit conditions to borrowers, and promote financial innovation in this market;

- (iv) provide practical demonstrations and develop effective methods for how utilities can serve as a platform for marketing and delivering EE projects and services in ways that benefit the customer, the utility and the general economy and society;
- (v) provide experience with utility-based EE finance methods that can be replicated by IFC with distribution utilities in other countries;

The full M&E work plan will be developed prior to CEO endorsement. A Preliminary M&E plan is included as Annex E.