



PROJECT EXECUTIVE SUMMARY
REQUEST FOR Council Work Program Inclusion
UNDER THE GEF Trust Fund

GEFSEC PROJECT ID: 2951
IA/ExA PROJECT ID: P098916
COUNTRY: China
PROJECT TITLE: Energy Efficiency Financing
GEF IA/ExA: World Bank
OTHER PROJECT EXECUTING AGENCY(IES):
National Development and Reform Commission
DURATION: 5 years
GEF FOCAL AREA: Climate Change
GEF STRATEGIC OBJECTIVES: CC-2
GEF OPERATIONAL PROGRAM: OP5
PIPELINE ENTRY DATE: December 2005
EXPECTED STARTING DATE: September 2007
EXPECTED CEO ENDORSEMENT: August 2007
IA/ExA FEE: \$1,215,000

FINANCING PLAN (US\$)		
	PPG	Project*
GEF Total		13,500,000
Cofinancing	(provide details in Section b: Cofinancing)	
GEF IA/ExA		200,000,000
Government		5,800,000
Others		377,350,000
Cofinancing Total		583,150,000
Total		596,650,000

** For multifocal projects, indicate agreed split between focal area allocations

FOR JOINT PARTNERSHIP**		
GEF PROJECT/COMPONENT (US\$)		
(Agency Name)	(Share)	(Fee)
(Agency Name)	(Share)	(Fee)
(Agency Name)	(Share)	(Fee)

*** Projects that are jointly implemented by more than one implementing agency (IA) or executing agency (ExA).

CONTRIBUTION TO KEY INDICATORS IDENTIFIED IN THE FOCAL AREA STRATEGIES:

- (1) Reduction of 3.9 million tons of CO₂ over the five-year project period, and avoidance of 78 million tons of CO₂ over the twenty-year life span of renovations financed by the project; and
- (2) Industrial energy conservation investment lending business line established and sustained in the banking sector.

Approved on behalf of the World Bank Group. This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the GEF Project Review Criteria for work program inclusion.

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Date: April 26, 2007

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ACRONYMS AND ABBREVIATIONS

CDB	China Development Bank
CDM	Clean Development Mechanism
EUEEP	UNDP/GEF China End-Use Energy Efficiency Project
CHUEE	IFC/GEF China Utility-Based Energy Efficiency Finance Program
CO ₂	Carbon dioxide
EMC	Energy management company
ESCO	Energy service company
ExA	Executing agency
FC	Fixed cost
GEF	Global Environment Facility
GHG	Greenhouse gas
GOC	Government of China
IA	Implementing agency
IFC	International Finance Corporation
M/V	Monitoring and verification
MOF	Ministry of Finance
Mtce	Million tons of coal equivalent
NDRC	National Development and Reform Commission
NECC	National Energy Conservation Center
OECD	Organisation for Economic Co-operation
PFI	Participating financial intermediary
PM	Project management
PMO	Project management office
TA	Technical assistance
UNDP	United Nations Development Programme
VC	Variable cost

1. PROJECT SUMMARY

a) PROJECT RATIONALE, OBJECTIVES, OUTCOMES/OUTPUTS, AND ACTIVITIES

RATIONALE

China is the second largest energy user and greenhouse gas (GHG) emitter in the world. Energy consumption in China has increased 5.8 percent annually between 1990 and 2006, more than three times faster than the world's average annual growth, rising from 990 million tons of coal equivalent (Mtce) in 1990 to 2,442 Mtce in 2006. Despite this unprecedented growth, China's per capita energy consumption is still less than one fifth of the Organisation for Economic Co-operation and Development (OECD) average, with significant room to grow as the economy continues to expand rapidly. If left unchecked, however, China's energy demand, primarily met by coal, will soon reach a level that will significantly contribute to the deterioration of local air quality and the increase of GHG emissions. Improving energy efficiency is one of the keys to sustaining China's economic growth with reduced energy needs and lessened local and global environmental impacts.

China's energy efficiency lags much behind the world's most efficient economies. Its energy-intensive manufacturing industries, accounting for about 50 percent of total final energy consumption, operate at significantly higher levels of energy intensity (energy use per unit of physical output) than international best practices. For example, the average energy intensities of raw steel, synthetic ammonia, and cement production at medium and large-sized facilities in China are 22, 37, and 40 percent higher, respectively, than international best practices.¹ The significant potential for conserving energy and reducing GHG emissions is largely untapped in these industries.

The Government of China (GOC) has stepped up its efforts to improve energy efficiency. In November 2004, the National Development and Reform Commission (NDRC) issued the nation's first Medium and Long Term Energy Conservation Plan (2005–2020), which highlighted 10 energy conservation programs targeting the country's major energy-consuming sectors. In the nation's Eleventh Five-Year Plan (2006–2010) for Economic and Social Development, endorsed by the People's Congress in March 2006, the GOC has pledged to reduce the energy intensity of GDP by 20 percent from 2005 to 2010. This would result in avoided energy consumption of about 560 Mtce annually by 2010. About a third of the avoided energy consumption is expected to come from specific technical improvements, especially in manufacturing, thermal power generation and buildings. The NDRC launched the 1000 Large Industrial Enterprises Energy Conservation Action Plan in April 2006, targeting the top 1008 largest industrial energy consumers, which account for approximately 30 percent of China's total primary energy consumption. The government efforts also include policy initiatives to foster technology development and deployment, and to provide various fiscal incentives for energy efficiency improvements.

¹ State Development and Reform Commission, Mid and Long-Term Energy Conservation Plan, 2004, in Project File.

The estimated needs for energy conservation investments to achieve the 20 percent energy efficiency improvement target surpass US\$50 billion.² The GEF is already supporting several major initiatives that will help China achieve this target. The UNDP/GEF China End-Use Energy Efficiency (EUEEP) Project is strengthening the capacity to develop and implement energy efficiency policies and regulations, focusing on buildings and industrial sectors. EUEEP's industrial program builds around voluntary energy efficiency agreements, energy efficiency design codes and standards. The IFC/GEF China Utility-Based Energy Efficiency (CHUEE) Finance Program is promoting installation of more energy-efficient equipment through energy utilities and equipment suppliers assisted by access to commercial bank financing backed by a guarantee fund. The World Bank/GEF Heat Reform and Building Energy Efficiency Project is promoting energy efficiency in the building sector by assisting the Government's heating sector market reforms and supporting energy efficiency innovations in building construction and heating system modernization. The First and Second World Bank/GEF China Energy Conservation Projects have catalyzed and accelerated market-based approaches to small-scale energy efficiency investments through the introduction of energy performance contracting scheme and launched the energy services industry in China. The energy management companies (EMCs) supported by the two projects achieved US\$245 million of investment business in 2005.³ However, few EMC investments have exceeded US\$1 million in part because the EMCs do not have adequate assets to secure larger loans from domestic banks. The energy efficiency loan guarantee schemes in the CHUEE project and the Second China Energy Conservation Project also are geared toward small investments usually under US\$2 million.

Until the late 1990s, public funds, such as the central government's dedicated energy-conservation funds and local government counterpart financing, were the primary financing source for large-scale industrial energy conservation projects. Since then, the GOC has gradually eliminated earmarked public funds for energy conservation project financing, expecting Chinese enterprises to invest their own resources and banks to build energy conservation lending business lines, given the economic and financial attractiveness of such projects. But this outcome has not materialized.

While Chinese experts agree that many medium and large-sized industrial energy conservation investments⁴ are financially viable (with two- to five-year payback periods), most of the concerned enterprises fail to finance them from internal resources, which they prefer to invest in expanding production capacity. Nor have such investments attracted the attention of the domestic banking sector. Now, in the wake of a dramatic 10-year expansion of China's energy-intensive manufacturing sector without much regard to improved energy efficiency, the

² Chen Hongwei, November 23, 2006, *Economic Daily*.

³ EMCs are the Chinese equivalents of energy service companies (ESCOs) in North America. These companies finance energy conservation projects of the clients and share the benefits of energy savings with the clients based on the performance of the energy conservation projects.

⁴ The size of an energy efficiency investment is defined by the estimated investment cost of a single energy-efficient technology intervention. The targeted energy efficiency investments of the proposed project range from about US\$5 to 25 million, compared with small sized investments of about US\$1 million or less. This selection is based on a survey conducted among three major energy-intensive manufacturing industries in China, covering 17 energy efficient technologies for the iron and steel industry, 30 for the chemical and petrochemical industry and 9 for the cement industry.

government's efforts to promote industrial energy conservation investments have taken on increased urgency.

There are many reasons why the lending market for medium and large-sized industrial energy conservation investments has remained essentially undeveloped, compared to its large potential. The main impediments are:

Technical complexity of medium and large-sized industrial energy conservation projects. Compared with small industrial energy conservation projects, which usually cost about US\$1 million or less and have very short payback periods (one to two years), medium and large-sized projects typically cost US\$5–25 million, require longer payback periods, and do not have a solid track record of good financial returns. They also are technically more complex, since they often involve the use of unfamiliar technologies and production processes. Such energy conservation projects also pose a risk of disrupting normal business operations, leading to lost production and revenues. Without ready access to commercial finance or strong regulatory pressure, these characteristics generally lead enterprises to defer or abandon major investments in energy efficiency improvements in favor of production expansions, which normally involve replication of standard technologies and fit well with the growth pressure in the Chinese economy.

The perceived high financial risks of industrial energy conservation lending among Chinese banks. Compared to production expansion, energy conservation usually does not directly generate additional revenues, but contribute to reduction of energy expenditures. This makes it difficult for banks to identify cash flows from the energy conservation projects as hard assets with sufficient market values to adequately justify loans. Chinese banks are not familiar with industrial energy conservation practices, nor do they have the internal capacity to properly evaluate their risks and benefits. The transaction costs are also perceived to be high because the variety of energy efficiency technologies would complicate project preparation, appraisal and supervision, as well as reduce repeat businesses. These perceptions lead the banks to believe that industrial energy conservation projects constitute unduly high financial risk, preventing the banks from either offering attractive financing terms to such projects or developing specialized industrial energy conservation lending business.

Insufficient institutional capacity, especially at the national level, to address the pressing needs of scaling up energy-efficiency investments. In the wake of the great expansion of energy-intensive industries and continued decentralization in the last 10 years or so, the government's ability, especially at the national level, to effectively implement its energy efficiency policies and programs has declined considerably in relative terms. Given the size and large weight of the energy-intensive industries in China's economy, as well as the widespread inefficient practices among their major facilities, policy and regulatory interventions need to be strengthened significantly to encourage industrial enterprise to undertake energy efficiency investments.

China's rapid ascendance to a world manufacturing powerhouse has not been accompanied by a transition of its industrial sector to reach world-class energy efficiency. The sharp increase in energy consumption since 2001, driven by surging demand in power generation

and energy-intensive industries, has driven up the energy intensity of the economy, reversing a descending trend of over 20 years. This has heightened the urgency in the Government to accelerate and scale up energy-efficiency policy interventions and led to intensified government focus on energy conservation during the 11th Five-Year Plan period. The combination of government priority to enhance industrial energy efficiency and the large stock of energy-inefficient industrial capital presents a significant window of opportunity to scale up energy efficiency investments with attractive investment returns in medium and large-sized manufacturing facilities.⁵ Seizing this window of opportunity requires a two-pronged approach: (a) demonstrating viable business models for industrial energy conservation financing at the domestic bank and enterprise level; and (b) strengthening the enabling environment and business capacities. The World Bank is uniquely positioned to provide the GOC with this support, given its close working relationship with the GOC, successful experience in integrating technical assistance and lending operations with the GOC's policy agenda, and its global energy efficiency financing experience.

OBJECTIVES

The development objective of the proposed project is to improve the energy efficiency of medium and large-sized manufacturing facilities in China's industrial sector. Its global environmental objective is to reduce China's GHG emissions by medium and large-sized energy consumers in energy-intensive industries. These objectives will be achieved by (a) developing sustainable energy conservation lending businesses in selected banks to support medium and large-scale energy conservation investments in these industries; and (b) strengthening government capability to enforce related laws, regulations and standards, and to supervise and monitor industrial energy conservation activities.

OUTCOMES AND OUTPUTS

The main outcomes of the project will be to (a) improve energy efficiency of medium and large-sized energy-intensive industrial enterprises; and (b) reduce greenhouse gas emissions of such industries. Its outputs will include (a) US\$ 400 million of energy efficiency financing provided by the participating financial institutions (PFIs) to medium and large-sized energy-intensive industries for energy efficiency investments; (b) Additional US\$ 150 million of energy efficiency investment financing requests in the pipeline of Chinese banks participating in the project, (c) energy efficiency financing preparation procedures and modalities adopted by Chinese banks participating in the project, and (d) the establishment of a fully-functioning National Energy Conservation Center.

ACTIVITIES

Component A: Promotion of Energy Efficiency Financing (estimated cost: US\$16.65 million, US\$9.9 million of GEF financing). The proposed activities will remove key barriers to

⁵ The size of an industrial enterprise is defined by its revenue. According to China State Statistical Bureau (2003 guideline), the annual revenue of a medium enterprise should be in the range of RMB30 to 300 million, and that of a large enterprise should be RMB300 million or more. The proposed project will primarily focus on three energy intensive industries: iron and steel, cement, and chemicals.

developing energy conservation financing business in the domestic banking sector primarily for medium and large-sized industrial energy conservation investments. They comprise:

(1) *Assistance to participating financial intermediaries (PFIs) for IBRD loan onlending* in (a) business start-up, including creation, organization, staffing, and initial business plan of the energy conservation lending business unit (or team); (b) capacity building and training, including development of necessary internal mechanisms, procedures, and adequate knowledge base to evaluate and extend loans to industrial enterprises for energy conservation projects; (c) marketing and energy conservation subproject pipeline development, (d) subproject due diligence support, including financial, technical, social and environmental assessment; (e) development of energy conservation-related financing instruments and risk management tools; and (f) output-based payment scheme linked to energy conservation lending to cover part of the incremental operational cost incurred by the PFIs to maintain a functioning EC business unit or team during the project period as mandated by the project.

(2) *Assistance to other banks* in (a) business start-up; (b) capacity building; and (c) due diligence. This assistance will be extended to at least two additional commercial banks, which will lend their own funds to eligible industrial energy conservation subprojects, amplifying the impact of the proposed project and demonstrating the commercial attractiveness of lending for industrial energy conservation investments. These two banks will be selected in the second year of the project implementation.

(3) *Assistance to the overall banking sector*. This will include a series of national workshops to present successful case studies of subprojects carried out by the PFIs in first one or two years, as well as introducing energy conservation technologies and financing products.

(4) *Assistance to energy conservation investment project demonstration*. This will support the preparation and implementation of two or three industrial energy conservation projects in sectors with large replication potentials, but with significant project development difficulties. The objective is to demonstrate effective business models and institutional arrangements for the preparation and financing of energy conservation projects. It will focus primarily on pre-investment activities, such as feasibility studies, due diligence and financing, and institutional arrangements.

Component B: Energy Conservation Investment Lending (estimated cost: US\$571.4 million; US\$0.4 million GEF financing). This component includes a total of US\$400 million energy conservation investment lending over five years and a corresponding US\$171 million equity investment by beneficiary enterprises, and energy conservation lending monitoring and verification activities:

(1) *Energy conservation investment lending by PFIs.* A US\$200 million IBRD loan will be on-lent by the GOC to two to three domestic banks⁶ which in turn will lend the funds to enterprises for energy conservation investment subprojects.⁷ These banks, alternatively referred to as PFIs, will be lent IBRD funds in the range of US\$50–120 million each (final allocations to be determined at project appraisal). They will be responsible for the repayment of the IBRD loan and will assume all financial risks. The PFIs have also preliminarily agreed to lend at least another US\$200 million for energy efficiency investments. It has been agreed that their formal commitments will be submitted to the Bank before project negotiation. The subproject beneficiary enterprises are also expected to contribute 30 percent equity investment, a standard requirement by Chinese banks, totaling US\$171 million.

The project staff of the PFIs will be trained to identify potential carbon financing candidates from their subproject pipelines. GEF assistance will not directly support any activities related to the implementation of carbon financing for the identified subprojects. However, the PFI project staff will maintain full transparency with its carbon finance counterparts with regards to GEF support for the identified subprojects. Prior review by the World Bank will be required for any eligible subprojects that will apply for carbon financing from the funds managed by the World Bank. The prior review will assess whether the agreed due diligence process is being strictly followed.

(2) *Monitoring and verification of energy conservation lending:* independent verification of energy conservation lending for the disbursement of the output-based incremental cost payment scheme, as well as monitoring of energy conservation subproject performance.

Component C: National Policy Support and Capacity Building (estimated cost: US\$7.8 million, US\$2.8 million of GEF cofinancing): This component will strengthen government capabilities to implement industrial energy-efficiency policies and programs in the following ways:

(1) *Assisting establishment of the National Energy Conservation Center (NECC),* approved by the State Council in August 2006. The main objective of the NECC is to support the implementation of national energy conservation policies and programs. This subcomponent will provide organizational and strategic planning assistance to the establishment of NECC, as well as help develop initial work programs of NECC.

(2) *Supporting the implementation of priority national energy conservation programs of the 11th Five-Year Plan.* This will mainly include a midterm review (in 2008) of implementation activities to identify problems, recommend remedial measures, and prepare and implement recommended measures.

⁶ The Bank is currently preparing the project with the China Development Bank (CDB), Huaxia Bank (Huaxia) and the China Export and Import Bank (Exim). The final selection of the banks will be determined, in consultation with the GOC, during appraisal stage.

⁷ The working definition of an energy conservation subproject as adopted in the PFI operational manuals is that the energy cost savings resulting from the subproject will yield a simple payback period of 10 years for the total investment, and that such sub-projects are limited to renovation and rehabilitation within the confines of the beneficiary enterprise's existing facility.

Component D: Project Implementation Support and Reporting (estimated cost: US\$0.8 million; US\$0.4 million of GEF cofinancing): Because of the innovative character, complexity, and scale of the project, consultants will be recruited to support the implementation of the project, including coordinating technical assistance activities to the banks and the government, as well as organizing project monitoring, evaluation, and reporting activities.

b) KEY INDICATORS, ASSUMPTIONS, AND RISKS (FROM LOGFRAME)

INDICATORS

The indicators of the project's broad development effectiveness and global environment benefit will be the reduction of average energy intensity in large enterprises within key energy-intensive industries and the associated reduction in carbon dioxide (CO₂) emissions.

At the project level, the key indicators include the total energy conservation lending of PFIs and associated avoided energy consumption (details in Annex B).

ASSUMPTIONS

The key strategic assumption is a continuation of the GOC's proactive policies and programs for industrial energy conservation. It is also assumed that, with the assistance of the proposed project, and the GEF barrier-removal support in particular, the Chinese banking sector will be able to quickly develop a robust industrial energy conservation lending business and considerably expand the energy efficiency investment market in China.

RISKS

The overall expected risk level for the proposed project is moderate. A main risk is that the current government agenda to promote industrial energy conservation is set back by continued focus on expansion-oriented economic development, undermining efforts to motivate industries to improve energy efficiency and diverting financial resources away from energy conservation investments. While continued capacity expansion is vital to the government's overall development agenda, there is a genuine concern about the growing environmental burden of China's rapid economic growth and serious government intention to promote sustainable development. Such concern and intention are prominently expressed in the 11th Five-Year Plan. In addition, the aforementioned risk is mitigated by a comprehensive system being set up by the government to implement and monitor the goal of reducing the energy intensity of GDP by 20 percent from 2005 to 2010.

Other risks are project specific, including mainly (a) slow disbursements of the IBRD and counterpart funds for energy conservation lending because of a weak subproject pipeline and a slow buildup of PFIs' capacity to appraise and process subproject loans; and (b) a slow pace in establishing the National Energy Conservation Center as a result of budget and staffing difficulties. The first specific risk will be mitigated by requiring and helping each PFI to identify energy conservation subprojects worth at least 30 percent of its total lending envelop over the

project period prior to project negotiation, as well as by providing targeted technical assistance in energy conservation lending business startup, capacity building and in marketing and subproject pipeline development, including support for early demonstration projects aimed at showcasing streamlined subproject preparation and implementation procedures. The PFIs have already initiated work to build their subproject pipeline and have expressed strong confidence that the 30 percent commitment target by the time of negotiation will be comfortably met. The second risk is mitigated by the strong leadership assumed by the NDRC in creating NECC and the pressing need of the government to strengthen its implementation capacity for the priority energy conservation programs endorsed by the 11th Five-Year Plan.

2. COUNTRY OWNERSHIP

a) COUNTRY ELIGIBILITY

China ratified United Nations Framework Convention on Climate Change on May 1, 1993.

b) COUNTRY DRIVENNESS

The proposed project is requested by the NDRC and the Ministry of Finance (MOF) to assist implementation of the GOC's strategy in developing and scaling up commercial financing for energy conservation, especially in the industrial sector. The GOC has endorsed the project as one of its GEF-4 climate change assistance priorities. The GOC views the proposed project as an important follow-up to the First and Second China Energy Conservation Projects in an effort to broaden the scope and increase the scale of industrial energy conservation investments, primarily targeting medium and large-size energy-intensive industrial facilities, which are considered by Chinese experts to be "goldmines" of energy savings. The main activities of the project were proposed by the government and reflected the areas where World Bank and GEF supports are considered critical. The proposed activities were further refined during a World Bank mission conducted in January 2007. The government has expressed strong desire to move this project forward quickly, so as to achieve greater effects in energy savings and CO₂ emissions reduction.

3. PROGRAM AND POLICY CONFORMITY

a) FIT TO GEF FOCAL AREA STRATEGIC OBJECTIVES AND OPERATIONAL PROGRAM

The proposed project is consistent with the GEF's draft Climate Change focal area strategy CC2 - promoting industrial energy efficiency through its Energy Efficiency Operational Program. As called for in the strategy, it focuses on GHG-intensive industries in countries with a large and growing industrial sector and will remove the technical and financial barriers to higher energy efficiency.

The proposed project will also promote carbon financing under the Clean Development Mechanism (CDM).

b) SUSTAINABILITY (INCLUDING FINANCIAL SUSTAINABILITY)

Energy conservation is one of GOC's strategic priority policies to promote sustainable economic development. The Energy Conservation Law of China was issued in 1997 and will be strengthened after the ongoing amendment. One major effort of the GOC since the late 1990s has been the encouragement of market-based energy conservation schemes, as evidenced by the strong support to and the growing strength of energy management companies. The proposed project was requested by the GOC as a key part of the continued effort to broaden and scale up market-based energy conservation initiatives, especially in industrial energy conservation investment financing, an area traditionally supported by government funds. The government's own assessment and independent evaluation by international consultants have confirmed that there are large untapped bankable energy conservation investment opportunities in energy-

intensive industries, and the domestic banking sector can develop and build a viable commercial energy conservation lending business and substantially increase investments in industrial energy conservation renovations. The proposed project has been designed together with the participating banks and the government to address their critical concerns about the entry barriers and business risks of industrial energy conservation financing. The effectiveness of the project is improved by the integrated approach of (a) operational engagement of financial institutions by making available special loan funds dedicated to industrial energy conservation lending, and (b) provision of technical assistance for capacity and market development that directly support the energy conservation lending activities of PFIs. The recently launched national program to strengthen energy management at the largest 1,008 industrial facilities also enhances the project's sustainability by inducing energy conservation financing demand from large, established enterprises which the banks would be more inclined to lend to for energy conservation investments.

c) REPLICABILITY

The proposed project will be replicated in two ways: (a) replication of energy conservation lending business model(s) among domestic banks; and (b) replication of specific energy conservation business lines in particular industries. The replication of energy conservation lending business model(s) among domestic banks will be reinforced by providing assistance at a later phase of the project to two additional banks that will use their own resources to finance industrial energy conservation investments. The quick dissemination of the early experiences of the PFIs throughout the banking sector and the targeted industries also is likely to result in potential replication initiatives. Concerning the replication of specific energy conservation business lines in particular industries, it is expected that PFIs will build expertise in energy conservation lending to specific industries and project types, based on their project portfolios and targeted markets. Through such rigorous specialization and replication, the PFIs should be able to quickly build a strong knowledge base and develop a portfolio of financially sound energy conservation subprojects, lower transaction costs significantly as evaluation and appraisal processes are streamlined, and thereby gain business confidence to further scale up their energy conservation business line. As more industrial enterprises begin to implement energy conservation projects and the financial benefits of such projects are increasingly widely recognized, other enterprises are likely to find energy conservation investments as good opportunities to enhance their financial position. The banks may also become less risk-averse to doing business with enterprises across the credit rating spectrum because of improved knowledge and confidence in the financial returns of energy conservation projects. Overall, the replication potential is backed by the large size of the industrial energy conservation market in China, especially in primary energy intensive manufacturing industries, such as steel, cement, synthetic ammonia, and petrochemicals.

d) STAKEHOLDER INVOLVEMENT

The key project beneficiaries include domestic banks, industrial enterprises, and government energy conservation agencies and organizations. Over the course of the last two years, close consultations had been conducted to identify and design the proposed project. More recently, intensive working sessions have been held with participating banks, the NDRC, and

Chinese experts to refine project design and strengthen preparation work. A meeting of key stakeholders hosted by the MOF will be held in April 2007. Other project beneficiaries and stakeholders include providers of energy conservation services and technologies, industrial trade associations, and other bilateral and multilateral donors. All of them have been consulted during the initial phase of project concept development and will be involved to different degrees during project preparation and implementation.

e) **MONITORING AND EVALUATION**

Performance monitoring of the proposed project would include (a) the monitoring of performance indicators as included in Annex B and (b) annual progress reports and a midterm review on the preparation and implementation of the project components. The PMO will be responsible for monitoring and evaluation activities associated with Components B and C, including the collection of project performance information and reporting on the impact and results of this project. The PMO will develop a monitoring and evaluation plan during the first year of implementation, and a full-time member of the PMO will be assigned to collect information and develop databases to monitor the performance and progress of implementation of both components. For component A, the project team within each PFI will be responsible for collecting information under the assistance of the PMO and reporting to the Bank through the PMO.

As part of Component A, US\$2.55 million of GEF grant is proposed for output-based payment scheme, which will cover part of the incremental cost of energy conservation lending based on each PFI's level of energy conservation lending. The project will engage an independent third party to monitor and validate the energy conservation lending disbursements, and payments under the scheme will be made only pursuant to the third party confirmation.

Monitoring and evaluation will also form the basis for dissemination of practical experience in financing medium to large-sized energy conservation subprojects. The experience of the selected PFIs will be disseminated to promote energy efficiency financing in non-PFI banks selected for GEF assistance. Further, successful case studies in the first one or two years of project implementation, including information on financing products and energy conservation technologies applied, will be disseminated through national workshops. The project, under Component C (National Policy Support and Capacity Building), is also supporting the development of energy efficiency monitoring and evaluation capacity at the NECC, which will enable improved energy conservation information collection, analysis, and dissemination.

4. **FINANCING**

a) **PROJECT COSTS:**

<i>Project Components/Outcomes</i>	<i>Cofinancing (US\$)</i>	<i>GEF (US\$)</i>	<i>Total (US\$)</i>
1. Promotion of Energy Efficiency Financing	6,750,000	9,900,000	16,650,000
2. Energy Conservation Investment Lending	571,000,000	400,000	571,400,000
3. National Policy Support and Capacity Building	5,000,000	2,800,000	7,800,000
4. Project implementation support budget/cost*	400,000	400,000	800,000
Total project costs	583,150,000	13,500,000	596,650,000

* This item is an aggregate cost of project implementation support; breakdown of this aggregate amount is

be presented in table b) below.

b) PROJECT IMPLEMENTATION SUPPORT BUDGET/COST⁸

<i>Component</i>	<i>Estimated staffweeks</i>	<i>GEF(US\$)</i>	<i>Other sources (US\$)</i>	<i>Project total (US\$)</i>
Locally recruited personnel*	1,100	390,000	110,000	500,000
Internationally recruited consultants*			0	0
Office facilities, equipment, vehicles, and communications			210,000	210,000
Travel			50,000	50,000
Miscellaneous		10,000	30,000	40,000
Total		400,000	400,000	800,000

* Local and international consultants in this table are those who are hired for functions related to the management of project. For those consultants who are hired to do a special task, they would be referred to as consultants providing technical assistance.

c) CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

<i>Component</i>	<i>Estimated staffweeks</i>	<i>GEF (US\$)</i>	<i>Other sources (US\$)</i>	<i>Project total (US\$)</i>
Personnel				
Local consultants	4,872	5,300,000		5,300,000
International consultants	656	3,700,000		3,700,000
Total	5,528	9,000,000		9,000,000

d) COFINANCING SOURCES⁹

<i>Cofinancing sources</i>				
<i>Name of cofinancier (source)</i>	<i>Classification</i>	<i>Type</i>	<i>Amount (US\$)</i>	<i>Status*</i>
The World Bank	Implementing agency	In cash	200,000,000	IBRD lending pipeline
PFI	Beneficiaries	In cash	206,350,000	Pledged
Beneficiary Enterprise	Beneficiaries	In cash	171,000,000	Subproject equity investment required by PFIs
GOC	National government	In cash	5,400,000	Pledged
		In kind	400,000	Pledged
Subtotal cofinancing			583,150,000	

* Reflect the status of discussion with cofinanciers. If there are any letters with expressions of interest or commitment, please attach them.

5. INSTITUTIONAL COORDINATION AND SUPPORT

a) CORE COMMITMENTS AND LINKAGES

⁸ For all consultants hired to manage a project or provide technical assistance, please attach a description in terms of their staff weeks, roles, and functions in the project, and their position titles in the organization, such as project officer, supervisor, assistants or secretaries.

⁹ Refer to the paper on Cofinancing, GEF/C.206/Rev. 1.

The objectives of the proposed project are fully consistent with the Country Partnership Strategy for 2006–10 (Report No. 35435-CN), approved by the World Bank Board of Directors on May 23, 2006. It directly supports a major strategy of the Country Partnership Strategy for China: *managing resource scarcity and environmental challenges (pillar 3)*. It will also contribute to the Bank's recent efforts of developing a new investment framework to promote clean energy and energy efficiency by exploring effective ways of incorporating carbon finance and GEF technical assistance into the Bank's lending operations in China. In addition, the proposed project would support the World Bank Group corporate commitments to increasing renewable energy and energy efficiency lending support to clients by at least 20 percent per year during 2005–10.

b) CONSULTATION, COORDINATION, AND COLLABORATION BETWEEN IAS, AND IAS AND ExAs, IF APPROPRIATE.

As part of the project design process, the World Bank project team and the NDRC have reviewed other multilateral and bilateral energy efficiency projects in China. Of direct relevance is the EUEEP Project financed by GEF and being implemented by the UNDP and NDRC. Areas of coordination and collaboration between the proposed project and EUEEP have been identified. The NDRC, which is the executing agency for both projects, will take the lead. One of the main technical assistance activities of the EUEEP project, Capacity Building and Training for Provincial Energy Conservation Centers, will reinforce Component C of the proposed project (C1: Assistance to the Establishment of the National Energy Conservation Center). The EUEEP also will provide substantive energy audit trainings to selected provincial energy conservation centers. This will be linked to the identification and preparation of the energy conservation investment subprojects financed by the PFIs. The proposed project with its focus on debt-financing for industrial energy conservation will feed into EUEEP's activity in Policy Development on Energy Efficiency Financing Options. A meeting between the project team and the EUEEP implementation team is scheduled in April 2007 to discuss the details of the coordination, with special attentions to overlapping activities so as harness synergy and avoid repetitions.

The proposed project will also coordinate with the China Utility Energy Efficiency Project (CHUEE), which is being implemented by the IFC of the World Bank Group with a \$50 million of risk-reserve facility (\$40 million from IFC and \$10 million from GEF) and additional \$3.5 million of technical assistance from GEF. The objective of the project is to develop a utility-based business model for marketing, selling and installing energy efficiency equipments to small/medium sized commercial, industrial, and municipal/institutional sector customers, e.g., hospitals and government buildings, and multi-family residential sector. The project team will in particular look into how CHUEE has facilitated commercial banks' energy efficiency lending in supporting industrial end-users. An update of CHUEE implementation progress was obtained in March 2007.

c) PROJECT IMPLEMENTATION ARRANGEMENT

The proposed project will be implemented over five years. It has two parallel tracks of closely related activities that require different types of attention: Track 1—Energy Efficiency Lending and Technical Assistance to PFIs corresponding to Component B, and A (1), and Track 2—Capacity Building and Technical Assistance corresponding to Components A (2), A (3), A (4), C, and D. PFIs will be responsible for the implementation of activities under Track 1. NDRC will be responsible for the implementation of activities under Track 2. A PMO will be established under NDRC to manage the project activities under Track 2 on behalf of NDRC. In addition, a Steering Committee comprising representatives of the MOF and NDRC will provide policy guidance to PFIs and other stakeholders for project implementation.

Track 1: Energy Efficiency Lending. The MOF will represent the GOC in signing the Bank loan agreement. It will pass on the funds to PFIs, in accordance with an onlending agreement to be signed between the MOF and PFIs. As evidence of its commitment to the project, the MOF has indicated that the loan will be passed on to PFIs with the same terms and conditions as the Bank loan. The PFIs have the full responsibility of the energy efficiency lending and related technical assistance activities, and bear all the financial risks. To a large extent, the lending activities will be implemented within the existing institutional framework and under their existing business procedures and regulations. However, it has also been agreed that within each PFI, a project team will be formed to coordinate or implement the lending activities and to act as the focal point of the PFI to interact with the Bank, the PMO, and other stakeholders.

PFIs are preparing their operational manual for the project, which will cover financial management, institutional arrangements, and technical, procurement, supervision, environmental, and social due diligence procedures and methodology, as well as business procedures. The energy conservation subproject lending eligibility criteria will also be detailed in the operational manual. The draft manuals will be provided to the Bank for review prior to appraisal and will be finalized with the Bank during the project appraisal.

The project will use a report-based disbursements method (to be decided during appraisal), subject to the final agreement between the Bank, MOF, and PFIs. The report format, content, and frequency will be decided during project appraisal. Consistent with their asset and liability management strategies and business needs, all PFIs expressed a preference to limit the number of withdrawals to two. Accelerated disbursement will not result in relaxation of Bank surveillance and supervision of project implementation. Following full disbursement of Bank loan proceeds, PFIs will continue to provide loans to energy conservation investments. The possibility is also open for PFIs to seek additional financing from the Bank, if necessary.

Track 2: Capacity Building and Technical Assistance. Working together with the MOF, the NDRC will be responsible for the implementation of technical assistance activities under Track 2. The PMO has been effectively conducting project coordination activities for the first and second China Energy Conservation Project. Coordination responsibilities for the proposed project will also be undertaken by the same PMO. The PMO will also coordinate with the selected domestic banks, national and provincial government bodies, and other relevant stakeholders.

Detailed implementation arrangements will be further designed during project preparation to ensure effective technical and financial implementation of the project. For the immediate future, the PMO under the NDRC will coordinate all activities in cooperation with the World Bank project team.

ANNEX A: INCREMENTAL COST ANALYSIS

National Development and Global Environment Context

China's rapid ascendance to world manufacturing powerhouse has not been accompanied by a transition of its industrial sector to reach world-class energy efficiency. The sharp increase in energy consumption since 2001, driven by surging demand in power generation and energy-intensive industries, has helped drive up the energy intensity of the economy, reversing a descending trend of over 20 years. This has heightened the urgency in the government to accelerate and scale up energy efficiency policy interventions.

The continuing fast expansion of China's economy and the large size of its (existing) inefficient sectors require dual attentions to energy efficiency improvements. China must seize the opportunity of growth and strive for adopting state-of-the-art energy technologies in all new capital investments. It will also need to invest in energy efficiency renovation of the existing physical plants and facilities that will continue to operate in the next 10–20 years, or even longer. The consensus among Chinese experts is that most of the existing capital stocks in China's energy-intensive industries, especially those in medium and large-sized enterprises, will still remain in production until at least 2020.¹⁰ There is a window of opportunity to rehabilitate and upgrade the existing capital stocks to improve their energy efficiency in the next five years or so.

The government has adopted a comprehensive policy to increase energy efficiency investments in major energy-consuming sectors, especially in energy-intensive industries, with strong efforts during the 11th Five-Year Plan period (2006–10). The proposed project, especially the GEF-supported components, will assist the implementation of national energy conservation programs with the objective of building capacity for long-term and sustained energy efficiency improvements, focusing on removing barriers to financing energy conservation investments in medium-size to large manufacturing facilities in energy-intensive industries where major energy-efficiency renovations have stalled.

The energy-intensive manufacturing sectors, such as iron and steel, building materials, and petrochemical industries, consume approximately 50 percent of China's total primary energy and have great potential for cost-effective energy saving investments. Even the good practices in relatively modern large facilities of these industries still require 20–50 percent more energy per unit physical output than international best practices (Table A1).

Table A1: Energy Use per Unit Physical Output—Large Enterprises vs. International Best Practices, 2000

	<i>Raw steel</i>	<i>Cement</i>	<i>Plate glass</i>	<i>Synthetic ammonia</i>	<i>Ethylene</i>	<i>Petroleum refining</i>
International best practice	100	100	100	100	100	100
Large enterprises in China	122	140	150	137	141	140

Note: According to the State Statistical Bureau, industrial enterprises with an annual revenue at or above Y 300 million are classified as “large.”

Source: State Development and Reform Commission, Mid to Long-Term Energy Conservation Plan, 2004.

¹⁰ For example, China now produces 30 percent and 45 percent of the world's raw steel and cement, respectively. Most of the production capacities were added in the past 5–10 years.

The government has set a target of achieving 560 Mtce energy savings between 2005 and 2010. It is estimated that one third of the expected energy savings will come from technical improvements, and the rest from structural changes of the economy. The energy savings potential achievable through energy efficiency renovation among the existing medium and large-sized manufacturing facilities of iron and steel, cement, plate glass, synthetic ammonia, ethylene, and petroleum refining are between 30 Mtce and 50 Mtce per year. Much energy savings can be realized by energy conservation investments with less than five years of simple payback time.¹¹ These represent major opportunities for GEF intervention and will result in significant amount of reduction in carbon dioxide emissions.

Main Barriers to Scaling up Investments in Industrial Energy Efficiency Renovations

The needs for energy efficiency renovation in medium and large-sized manufacturing facilities in energy-intensive industries are large. However, actual investments in such investment projects remain limited. For examples, coke dry quenching, a reliable technology with attractive financial returns (about four years of simple payback time), is applied in only 10 percent of the medium and large-sized coking plants. The main barriers to scaling up investments in major energy-intensive manufacturing facilities include the following:

- (1). ***Perceived high technical and financial risks by industrial enterprises.*** Compared with small-scale industrial energy conservation projects, which usually cost about US\$1 million or less per project and have very short payback periods (one to two years), medium and large-sized projects typically are technically more complex, sometimes involving new technologies and optimization of production processes, have no solid record of reliable financial returns, and require longer payback periods. Such characteristics often lead enterprises to defer or abandon major investments in energy conservation renovations in favor of production expansions, which normally fit well with the general growth pressure in the Chinese economy.
- (2). ***Unfamiliarity with industrial energy conservation technologies and a lack of knowledge of energy efficiency business opportunities among Chinese banks.*** Chinese banks are accustomed to providing loans for production expansion projects and have little experience in financing energy conservation projects, in part because of the lack of demand. The lack of specialty experience and skills and the large variety of energy conservation technologies do not encourage the banks to start their own initiatives in energy efficiency lending because of perceived difficulties for repeat businesses and the high costs of project appraisal and supervision. In addition, energy conservation investments usually do not generate additional revenues, but rather contribute to profit margins through a reduction in energy expenditures. This makes it difficult for banks to identify and trap cash flows from such projects and take energy savings as assets of sufficient market value to justify a loan, often resulting in unattractive financing cost and terms. As such, Chinese banks have not developed operational capacity for direct energy-

¹¹ Consultant report: Energy Efficiency Renovation Technologies in Iron and Steel, Construction Materials, and Petro-Chemical Industries of China; Tokyo Energy Efficiency Group, December 2006.

efficiency lending to industrial enterprises, nor do they have a good understanding of the major investment opportunities in industrial energy conservation.

- (3). *Insufficient institutional capacity, especially at the national level, to address the pressing needs of scaling up energy-efficiency investments.* The government has set ambitious goals for energy efficiency improvements for the 11th Five-Year Plan period and in the next 15 years. Achieving these goals will require a combination of market-based policy instruments and enforcement of regulations and standards. In the wake of the great expansion of energy-intensive industries in the last 10 years or so, the government's capability to effectively implement its energy efficiency policies and programs has declined considerably in relative terms. Given the size and large weight of the energy-intensive industries in China's economy, as well as the widespread inefficient practices among their major facilities, policy and regulatory interventions need to be strengthened significantly to encourage industrial enterprise to undertake energy efficiency investments.

Baseline Scenario

Without the proposed project, it is expected that energy efficiency financing for medium and large-sized industrial energy conservation investments through direct lending by domestic banks will remain negligible in the next five years. The participating banks will not conduct explicit marketing and pipeline development activities for energy efficiency lending, nor will they seek to establish the energy efficiency lending business lines in a systematic manner (with specialized unit and budget).

Under the baseline scenario the implementation of the government's energy conservation policies and programs will also be affected negatively because of a slower pace in developing the capacity of the soon-to-be-established NECC and inadequate resources for other time-sensitive activities, for example, the midterm review of the energy efficiency programs of the 11th Five-Year Plan.

GEF Alternative and Barrier-Removal Activities

The proposed project will remove the above barriers through targeted technical assistance activities and an output-based subsidy to partially cover the operating costs of new energy efficiency lending business. The details are described in Table A2.

Table A2: Effects and Outcomes of Barrier-Removal Activities

<i>Barrier-removal activities</i>	<i>Effects and outcomes</i>
Support for Promotion of Energy Efficiency Financing (Component A of the Proposed Project)	Addressing Barriers 1 and 2 while also supporting the removal of Barrier 3.
A1. Assistance to participating banks in business startup, capacity building, marketing and subproject pipeline development, subproject due diligence, development of energy conservation financial products and support to cover part of the	Accompanied by an infusion of an IBRD onlending loan of US\$200 million IBRD, this subcomponent will help jumpstart the energy efficiency lending business of three participating banks (alternatively referred as PFIs). With a focus on learning by doing, GEF

<p>incremental cost of maintaining the mandated new energy efficiency business unit or team.</p>	<p>technical assistance will help the banks develop internal capacity to identify, prepare, and appraise industrial conservation investment projects, build sectorwise specialty areas and business lines, as well as manage risks. In addition to the US\$200 million IBRD onlent funds, the three participating banks are expected to lend another US\$200 million from their own funds for industrial energy conservation investment over five years.</p> <p>A GEF grant will also provide support for marketing and energy conservation subproject pipeline development, which will raise awareness of the new energy efficiency lending business lines among medium and large-sized industrial facilities and help the participating banks to develop lending pipelines.</p> <p>GEF assistance will provide support to the PFIs for due diligence of energy conservation subprojects, with which the banks are not familiar and thus build the expertise required to scale-up energy conservation lending. In addition, GEF grant will support PFIs to develop financial instruments and risk management tools which are tailored towards energy conservation lending.</p> <p>A portion of GEF assistance will be disbursed as an output-based payment based on independent verification of energy conservation lending by the banks. Disbursing part of the incremental cost assistance through the output-based payment scheme is expected to encourage the banks to quickly scale up their energy efficiency lending business.</p> <p>The outcome will be significantly shortened learning curves for the participating banks, attainment of a critical mass of bank lending to medium and large-sized industrial energy conservation projects, and a successfully demonstrated energy efficiency lending business development model that can be replicated by other domestic banks.</p>
<p>A2. Assistance to other banks in establishment of energy efficiency lending business</p>	<p>Similar GEF energy efficiency business development assistance will be extended to two nonparticipating banks (without IBRD loan) at a later phase of the project to leverage additional energy efficiency lending.</p>
<p>A3. Assistance the overall banking sector</p>	<p>This subcomponent will disseminate the early experience gained from the energy efficiency lending practices of the participating banks and serve as a platform/forum for knowledge exchange and energy efficiency business promotion.</p> <p>The outcome will be a broad awareness of the opportunities of and financing products for industrial</p>

	energy conservation, which will lead to further expansion of the energy efficiency lending business beyond the direct beneficiary banks.
A4. Assistance to energy conservation project demonstration	<p>This will support the preparation and implementation of two or three industrial energy conservation projects in sectors with large replication potentials, but with significant project development difficulties, focusing primarily on preinvestment activities, such as feasibility studies, due diligence, and financing arrangements.</p> <p>In addition, assistance will be provided for the development of an assessment, supervision, and monitoring system for government-supported or cofinanced industrial energy conservation projects. This will help streamline the selection and approval process of projects, laying a foundation for scaling up government fiscal and financial support for industrial energy conservation on one hand, and helping industrial enterprises better access government energy efficiency investment incentives on the other.</p>
Monitoring and verification of PFIs' energy conservation lending (Component B2 of the proposed project)	This will mainly support independent verification of energy conservation lending for the disbursement of the output-based incentive grant, as well as monitoring of energy conservation subproject performance.
National Policy Support and Capacity Building (Component C of the Proposed Project)	Addressing Barrier 3.
C1. Assistance to the establishment of the NECC	<p>To support the government's efforts to strengthen the institutional capacity of energy efficiency interventions, the proposed project will provide major assistance to the establishment and initial operation of NECC, focusing on strategic planning, work program development, and capacity enhancement.</p> <p>The outcome will be a well-positioned organization able to provide critical and effective supports to the government in the implementation of major national energy conservation policies and programs.</p>
C2. Assistance to the implementation of the 11 th Five-Year Plan	This subcomponent will help the government address urgent policy and institutional issues arising from the first two years of implementing the priority energy efficiency programs of the 11 th Five-Year Plan, thus easing the impediment to achieving the target of reducing the energy intensity of GDP by 20%.

GEF cofinancing for management, monitoring, and evaluation of the proposed project also is proposed (Component D). This will help ensure the efficient implementation of the proposed project and defray part of the costs of administrative and technical services for project management, monitoring, and evaluation.

Incremental Costs and Global Benefits

The incremental costs of the GEF alternative include (a) the costs associated with the technical assistance activities; (b) the capital cost of additional energy conservation investments; (c) the costs incurred by beneficiary banks for setting up and operating new energy conservation lending businesses; and (d) the costs of technical support to project implementation, monitoring, and evaluation. The total estimated incremental cost is US\$591.65million. The main assumptions of the incremental cost calculation are described in the Incremental Cost and Benefit Matrix at the end of section. The detailed incremental cost estimates and proposed GEF cofinancing are presented in Table A3.

Table A3: Estimated Incremental Cost and Proposed GEF Cofinancing

<i>Components and Activities</i>	<i>Incremental cost (US\$)</i>	<i>GEF (US\$)</i>
A. Promotion of Energy Efficiency Financing	16,650,000	9,900,000
<i>A1. Assistance to PFIs</i>	<i>11,150,000</i>	<i>6,300,000</i>
A1a. Business startup	1,200,000	600,000
A1b. Capacity building	1,600,000	900,000
A1c. Marketing and pipeline development	1,600,000	750,000
A1d. Subproject due diligence	1,750,000	1,200,000
A1e. Financial products development	500,000	300,000
A1f. Output-based incremental cost support	4,500,000	2,550,000
<i>A2. Assistance to other banks</i>	<i>1,600,000</i>	<i>800,000</i>
A2a. Business startup	600,000	300,000
A2b. Capacity building	600,000	300,000
A2c. Due diligence	400,000	200,000
<i>A3. Assistance to overall banking sector</i>	<i>300,000</i>	<i>300,000</i>
<i>A4. Assistance to energy conservation project demonstration</i>	<i>3,600,000</i>	<i>2,500,000</i>
A4a. Preparation of pilot projects	2,200,000	1,800,000
A4b. Development of an assurance system	1,400,000	700,000
B. Energy Conservation Investment Lending	571,400,000	4,500,000
<i>B1. Energy conservation lending by PFIs</i>	<i>571,000,000</i>	<i>0</i>
<i>B3. Monitoring and verification of energy conservation lending</i>	<i>400,000</i>	<i>400,000</i>
C. National Policy Support and Capacity Building	2,800,000	2,800,000
<i>C1. Assistance to the establishment of NECC</i>	<i>2,050,000</i>	<i>2,050,000</i>
C1a. NECC startup	300,000	300,000
C1b. Capacity development	1,300,000	1,300,000
C1c. Development of awareness programs	250,000	250,000
C1d. Assessment of energy auditing industry	200,000	200,000
<i>C2. Assistance to priority energy conservation programs</i>	<i>750,000</i>	<i>750,000</i>
C2a. 11th Five-Year Plan midterm review	250,000	250,000
C2b. Special studies	300,000	300,000
C2c. Adoption of international best practices	200,000	200,000
D. Project Implementation Support and Reporting	800,000	400,000
<i>D1. Supervision and reporting (staff and consultants)</i>	<i>430,000</i>	<i>320,000</i>

<i>D2. Operation (office, utilities, travel, etc.)</i>	370,000	80,000
Total project	591,650,000	13,500,000

Based on case studies of potential industrial energy conservation investment projects, the expected incremental energy efficiency investment volume of US\$571 million over five years (US\$200 million IBRD funds, US\$200 million of additional PFI lending and US\$171 million of equity contribution by beneficiary enterprises) is expected to result in about 1.6 Mtce of avoided energy consumption by the end of the project implementation period (see Table A4 below). Assuming a 20-year life span of the subproject investment, the cumulative avoided energy consumption amount will be 32 Mtce. The direct global benefit of the proposed project is expected to be 3.9 million tons and 78 million tons, respectively, of CO₂ emissions avoidance during the project period and over a 20-year life span.¹²

Table A4: Energy Conservation Investment and Energy Savings Resulting from the Proposed Project

	Year 1	Year 2	Year 3	Year 4	Year 5
Energy Conservation investment (US\$ million)	57	114	171	115	114
Energy Savings Yield (tce/yr per US\$ million)	2,800	2,800	2,800	2,800	2,800
New Energy Savings Capacity (tce/yr)	159,600	319,200	478,800	319,200	319,200
Cumulative Energy Consumption Avoided (tce/yr)					1,596,000

Without the proposed project (baseline), the total amount of energy conservation investments from the participating banks will be negligible over the next five years. Therefore, the incremental reduction of CO₂ emissions of the proposed project is 3.9 million tons of CO₂ over five years and 78 million tons of CO₂ over 20 years. The overall undiscounted unit incremental cost is about US\$7.6 per ton of CO₂ (based on US\$591.65 million of total incremental cost), of which GEF's contribution is about US\$0.2 per ton of CO₂.

Table A4: Incremental Cost Matrix

	<i>Baseline (without project)</i>	<i>Alternative (with project)</i>	<i>Increment</i>
Domestic Benefits	None	Avoided energy consumption of 32 Mtce over 20 years.	Avoided energy consumption of 32 Mtce over 20 years.
Global Benefits	None	Avoidance of 78 million tons of CO ₂ emissions over 20 years.	Incremental reduction of 78 million tons of CO ₂ emissions over 20 years.
Costs	(1) Technical assistance (TA): US\$0 (2) Cost of capital: US\$0 (3) Energy conservation lending operation costs: US\$0 Operational cost (OC): US\$0 Monitoring and verification (M/V):	(1) US\$14.95 million (2) US\$571 million (3) US\$4.9 million OC: US\$4.5 million M/V: US\$0.4 million	(1) US\$14.95 million (2) US\$571 million (3) US\$4.9 million OC: US\$4.5 million M/V: US\$0.4 million

¹² Assuming that year 1 investments start to generate energy savings in year 3.

	<p>US\$0</p> <p>(4) Project implementation support (PIS): US\$0</p> <p>Total baseline cost: US\$0</p>	<p>(4) PIS: US\$0.8 million</p> <p>Total alternative cost: US\$591.65 million</p>	<p>(4) PIS: US\$0.8 million</p> <p>Total IC: US\$591.65 million</p> <p>Proposed GEF cofinancing of IC is US\$13.5 million, including</p> <ul style="list-style-type: none"> • US\$10.15 million for technical assistance to banks, industries and government; • US\$2.55 million output-based grant for covering part of the incremental costs of energy conservation lending at PFIs; • US\$0.4 million for monitoring and verification of energy conservation lending at PFIs; and • US\$0.4 million for sharing project implementation support cost.
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ANNEX B: PROJECT LOGICAL FRAMEWORK

Results Framework

PDO	Project Outcome Indicators	Use of Project Outcome Information
<ul style="list-style-type: none"> Improve energy efficiency in medium and large-sized enterprises of energy-intensive industries. Reduce climate-change impact of medium and large-sized enterprises of energy-intensive industries. 	<ul style="list-style-type: none"> Average energy intensity of national key manufacturing facilities. Cumulative avoided CO₂ emissions from national key manufacturing facilities. 	<p>YR2–YR3: determine whether project assistance strategies and activities need to be adjusted</p> <p>YR5: feed into strategy for sustaining energy efficiency improvement in medium and large-sized enterprises.</p>
Intermediate Outcomes	Intermediate Outcome Indicators	Use of Intermediate Outcome Monitoring
Component A: Promotion of Energy Efficiency Financing <ul style="list-style-type: none"> Energy efficiency lending business line established and sustained at PFIs. Government energy efficiency financing programs strengthened. 	<ul style="list-style-type: none"> Energy efficiency financing demand of projects in the project pipeline. Energy conservation investment preparation procedures and financing modalities piloted. Energy conservation investment monitoring and evaluation procedures developed. 	<p>YR1–YR2: low levels may flag weak business development capacity at PFIs.</p> <p>Y3: introduce necessary adjustments in assistance strategy and activities.</p> <p>Y5: feed into strategy for sustaining and scaling up energy efficiency lending to energy-intensive manufacturing industries.</p>
Component B: Energy Conservation Investment Lending <ul style="list-style-type: none"> Increased energy efficiency investment in energy-intensive manufacturing industries. 	<ul style="list-style-type: none"> Cumulative amount of energy efficiency lending of participating banks. Cumulative energy consumption avoided from the energy efficiency lending of participating banks. Cumulative avoided CO₂ emissions resulted from the energy efficiency lending of participating banks. 	<p>Same as above.</p>
Component C: National Policy Support and Capacity Building <ul style="list-style-type: none"> Establishment and operation of NECC. Accelerated implementation of priority 	<ul style="list-style-type: none"> Establishment and functional operation of NECC. NECC business plan and initial work program developed. 	<p>YR1–YR5: monitor implementation progress to determine whether assistance is effective and approaches are realistic. Necessary adjustments made to meet policy and</p>

energy conservation programs of the 11 th Five-Year Plan.	<ul style="list-style-type: none"> • Midterm review of programs conducted and recommendations made. Necessary actions taken to enhance results. 	institutional development objectives.
Component D: Project Implementation Support and Reporting <ul style="list-style-type: none"> • Efficient implementation of China Energy Efficiency Financing Project. 	<ul style="list-style-type: none"> • Project targets and delivery schedule met. 	YR1–YR5: monitoring overall project progress and specific deliverables to determine efficiency of project coordination. Adjustment made to ensure project targets and milestones are met.

Arrangements for Results Monitoring

		Target Values					Data Collection and Reporting		
Project Outcome Indicators	Baseline 2006	YR1	YR2	YR3	YR4	YR5	Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
<ul style="list-style-type: none"> Average energy intensity of national key manufacturing facilities 	100 (average index)	100	99	98	96	94	Annual report	National Statistics NDRC reports	PMO
<ul style="list-style-type: none"> Cumulative avoided CO₂ emissions from national key manufacturing facilities 	0 (million tons of CO ₂)	0	16.7	33.4	66.8	100	Annual report	National Statistics NDRC reports	PMO
Intermediate Outcome Indicators									
Component A: Promotion of energy efficiency Financing <ul style="list-style-type: none"> Energy efficiency financing demand of projects in the project pipeline 	0 (million US\$)	70	150	150	150	150	Annual report	PFI records	PFI
<ul style="list-style-type: none"> Energy efficiency investment preparation procedures and financing modalities piloted 	n.a.		1–2 pilot projects prepared	1–2 pilot projects completed				Project reports	PMO
<ul style="list-style-type: none"> Energy efficiency investment monitoring and evaluation procedures developed 	n.a.		Draft	Final draft				Project reports	PMO
Component B: Energy Conservation Investment Lending <ul style="list-style-type: none"> Cumulative amount of 	0 (million	40	120	240	320	400	Annual report	PFI records	PFI

energy efficiency lending of PFIs	US\$)								
<ul style="list-style-type: none"> Cumulative energy consumption avoided from the energy efficiency lending of participating banks 	0 (Mtce)	0.16	0.48	0.96	1.28	1.60	Annual report		
<ul style="list-style-type: none"> Cumulative avoided CO₂ emissions from energy efficiency lending of PFIs 	0 (million tons of CO ₂)	0.39	1.18	2.34	3.12	3.90	Annual report		
Component C: National Policy Support and Capacity Building <ul style="list-style-type: none"> Establishment and functional operation of NECC 	n.a.		NECC formed staffed				Annual report	NDRC documents	PMO
<ul style="list-style-type: none"> NECC business plan and initial work program developed 	n.a.	Draft	Final Draft					Project reports	
<ul style="list-style-type: none"> Midterm review of 11th Five-Year Plan programs conducted and recommendations made. Necessary actions taken to enhance results 		Review carried out						Project reports	
Component D: Project Implementation Support and Reporting <ul style="list-style-type: none"> Project targets and delivery schedule met 	n.a.		Midterm review				Semiannual report	Project reports	PMO

n.a. Not applicable.

ANNEX C: RESPONSE TO PROJECT REVIEWS

a) Convention Secretariat comments and IA/ExA response

Not applicable.

b) STAP expert review and IA/ExA response

Review and Comments

by

Jayant Sathaye

10 March 2007

Summary

The goal of this project is to improve energy efficiency of medium and large scale industrial enterprises, and to reduce their climate change impact. Given China's rapid industrialization and fast growth of its manufacturing sector, in this reviewer's opinion, this is precisely the type of project that the World Bank and the Global Environment Facility should be undertaking. The project is technically feasible and manageable. It reflects priorities identified in studies undertaken by leading western and Chinese laboratories and institutes, and can build on the ongoing work under the GEF China EUEEP project.

The technical and financial barriers identified by the World Bank in the proposal are familiar and widespread in most industrial establishments in developing countries. The project calls for development of sustainable energy efficiency lending practices for the industrial sector in private and public banks, and the strengthening of government capability to enforce standards, rules and regulations, and monitor energy savings. Both will greatly enhance the credibility of energy efficiency practices in China.

In summary, I find this to be an excellent project, indeed the type of project that is creative and innovative and well-targeted to produce tangible sustainable development benefits.

General and specific comments by paragraph are noted in the sections below.

General Comments

The project is aimed at improving the efficiency of industrial enterprises. Industrial enterprises tend to have significantly higher hurdle rates for energy efficiency investments than indicated by the minimum attractive FIRR in the proposed project. This could be a risk factor that could lead to lower than expected demand for energy efficiency loans from prospective industries. This risk factor should be explicitly stated in the table on page 12.

The project proposal would benefit by including additional discussion of the types of incentives that would encourage enterprises to borrow for energy efficiency investment and approaches by which this project could strengthen those incentives.

The proposed project focuses on supporting investments whose only benefit is derived from direct energy savings. This energy-efficiency-centric criterion may discourage investments whose main

benefit is savings of material and other factor inputs. Material savings in turn yield larger savings of embodied energy. The project design should be made flexible enough to include and seek investment opportunities that capture non-energy and embodied-energy benefits.

The main text of the document, i.e., description of Project Components on pages 5-6, makes no mention of the role of GEF. It needs to provide a clear description of the GEF role in this project. This oversight may be corrected by adding a paragraph or two to describe the GEF role.

The sustainability and replicability sections could be further strengthened, especially on how to involve the whole banking sector. Because most banks lack technical skills and of necessity emphasize borrowers' financial credibility, it has been difficult to get them to focus on lending for energy efficiency improvements. The project's goals to introduce such plans in China are laudable. Replication and sustainability of the practices will require commitments at all levels particularly at the highest level where the main rationale for bank involvement may have little to do with energy efficiency per se. Ways to sustain non-energy-rationale will be important in order to maintain the interest in energy efficiency.

The technical rationale for the project is based on a consultant report. It would be very useful to provide a summary of the report in an appendix to the main report, and note its key findings in a separate section in the main text. .

Specific Comments

I would like to suggest the following specific considerations to improve various sections of the main text, and Appendix 15, "Incremental Cost Analysis".

Section A. Strategy Context and Rationale

- Para (P).2. The term energy conservation is often used to denote energy efficiency improvement through behavioral changes (turning off lights when no one is present for instance). Unless, energy conservation is a term of art that is widely accepted to mean all aspects of energy efficiency in the World Bank and affiliated institutions, it may be better to use the term energy efficiency in place of energy conservation in the document.
- P. 3. Please define the word "Medium" in the title – Medium and Long Term Energy Conservation Plan. What sizes of industry are being referred to here?
- P. 3 A recent article notes that China's energy efficiency gains are already lagging behind the 4% annual goal to 2010. This should provide added rationale for implementing the proposed energy efficiency loan, and reference to this document should be included in the text..
- P.4 At several places, the document refers to official publications or some significant events. In this paragraph, reference is made to "dramatic improvements in production capacities without significant energy efficiency improvements". It is my understanding that this is not correct. I have provided a chart to World Bank staff that illustrates the gains made by industry in this regard. It is important to either cite the document that the proposal text is based on, or rephrase the sentence in the proposal to note that despite such improvements, Chinese industry lags behind its international counterparts.
- P.5 This paragraph should cite the earlier experience with ADB loans, and note the lessons learned from these loans.
- P.7-8 Experience with industrial sector energy efficiency investments suggests that companies demand higher rates of return for investments made within the company that are primarily aimed at cost reduction. This may be due to the difference in capital and operating budgets, organizational reasons, downtime required to install new energy efficient equipment, or perceived higher technical risks. This fact should be noted in the paragraph.

Section B: Project Description

- P.14 The reasons for the World Bank to work through participating financial institutions are well articulated in the document, and it is an effective approach to reduce transaction costs and also build capacity that may be used to spur more such projects elsewhere in China. A note of caution, however, is warranted in this regard. A similar ADB project was set up with the Industrial Development Bank of India (IDBI) in order to on-lend energy efficiency loans to Indian industry for modernization and expansion purposes in the late 1990s. The response was relatively modest, and industry was reluctant to borrow funds for this purpose. In addition, IDBI staff did not set up technical capability within the bank, which precluded further replication and sustainability of this effort. In part this was caused by a recession in the industrial sector in the late 1990s, but it also revealed the reluctance on part of banks to build internal technical capacity and to take on technical challenges. The key issue here is to understand the rationale for an industry to take on debt financing for technically challenging projects, and for banks to be persuaded to take on technical tasks which will require them to retrain or hire staff with technical expertise..
- The project components section is missing an explanation about the role of GEF. A paragraph or more is needed to explain its role, which is articulated in Appendix 15.
- P.18 – Please check typos associated with loan amounts.
- P.18 – Please explain the incentive for PFIs to supplement the IBRD loans. As I understand it, this will be a requirement in order for PFIs to receive the IBRD loan. A sentence to this effect should be included in the text.
- P.25-26 These paragraphs are difficult to understand. They need to be restated in plain English so that a lay reader can understand their meaning. What is “diagnostic work and assistance”? What were the challenges? Shaped by what study? Reference? Please reword the italicized title of P.26. What was requested by the PFIs?
- P.27 Please explain lending volume. Is it the total amount or per loan? What is the amount?
- P.30 – Typo – difference – different
- P.31 – How will the project assist PFIs to develop a robust pipeline of sub-projects? Has bringing together industry, banks, etc. worked before? It is a laudable goal but usually it is difficult to get stakeholders with such diverse interests to work together.

Section C. Implementation:

- P.36 – What will be the link between this project team and PFI’s top management? It is critical that top management (TM) is aware of and approves energy efficiency activities. Typically, TM will have its own reasons to pursue energy efficiency activities, and unless those reasons continue to persist in the future, the replication and sustainability of future activities will be in jeopardy. How would the project ensure that energy efficiency can fulfill the current and future TM objectives? It would be useful to articulate the current and potential reasons for TM participation at the start of the project and revisit these as part of the monitoring plan of the project.
- P.41 – Check typo. – replace “would” with “will” in the first line, and what is \$3.2 million?
- P.42 – Is there a reference to the government’s own assessment?
- Table – Critical risks and possible controversial aspects
- I would think that the risk of slow subproject pipeline is medium and not low. I understand the pipeline is already at 30%, nevertheless industry will have high hurdle rates for such loans and a better rationale should be described if a “low” risk rating is to be retained.
- A category of sustainability and replicability should be included in the table to note the steps being taken to bring about market transformation in the sector, and to assign a risk rating for

these categories. This is particularly important from a GEF perspective since its main rationale is to provide seed funding for market transformation projects.

Section D. Appraisal Summary

- P.52 – The criteria used for accepting the FIRR rates is set too low. Most industrial projects demand a much higher FIRR for reasons noted in paragraphs 7-8 in the proposal and also above. The potential project participation rates should be reexamined using a higher hurdle rate and the number of potential projects where the FIRR exceeds this value should be recalculated.
- P.53 – What is the carbon price used in this calculation? Have other (non-energy savings) benefits been included in this calculation? Industry often will take on projects that produce savings beyond energy, for example, reduction in loss of material during its processing is more critical than mere energy savings. Such benefits should be factored into the assessment of the project, and in the calculation of the FIRR.
- P.54 – Please include this document or its executive summary in an appendix to the proposal.
- P.55 – Please explain what the GEF grant is designated for?
- P.58 – Please spell out “FT”.

Appendix 15: Incremental cost analysis:

- Page 74, para 2 – What will be the share of existing capital stock in 2020?
- Page 74, table – Please define “Large Enterprises”
- Page 75, para 1 – and will two-thirds come from structural change?
- Page 75, para 3 – Other important barriers include technology reliability, downtime, trust in technical recommendations, industry and bank capability to evaluate technical proposals.
- Page 76, para 2 – What is the magnitude of self financing?
- Page 77, B1 – Monitoring and evaluation will be a critical component of the role that PFIs and industry will need to play in order to ensure that energy savings are achieved as planned. This should be spelled out as a separate activity in this table. A good way to do this would be to ensure that there should be a monitoring plan prepared prior to the implementation of a project that industry borrowers should be asked to implement with verification by bank staff or third-party entities.
- Page 77, B3 – Please note the role of the top management as discussed above in P.36.
- Page 77, B4 – Please describe the business models that GEF technical assistance will demonstrate.

IA/ExA response

Responses to STAP reviewer comments:

Comments	Responses
1. General Comments	
<ul style="list-style-type: none"> • The project is aimed at improving the efficiency of industrial enterprises. Industrial enterprises tend to have significantly higher hurdle rates for energy efficiency investments than indicated by the minimum attractive FIRR in the proposed project. This could be a risk factor that could lead to lower than expected demand for energy efficiency loans from prospective industries. This risk factor 	<ul style="list-style-type: none"> • Enterprises’ perception of high financial risk associated with EC investments is in fact one of the main barriers identified (Para. 7, Page 2). The indicative threshold FIRR is meant to be a reference level for PFIs to screen subprojects. The medium FIRR of 56 industrial energy conservation measures surveyed during project preparation is 26.5%, far exceeding the threshold FIRR of

<p>should be explicitly stated in the table on page 12.</p>	<p>8%, which is the weighted average cost of capital. Still, mitigating the financial risk perception of enterprises will be a main effort of the proposed project. Please also refer to the risks and mitigations table on Page 12.</p>
<ul style="list-style-type: none"> The project proposal would benefit by including additional discussion of the types of incentives that would encourage enterprises to borrow for energy efficiency investment and approaches by which this project could strengthen those incentives. 	<ul style="list-style-type: none"> The grant support to EC investment lending will enable PFIs to lend at a rate which is slightly lower than that of their normal industrial loans, a significant financial incentive to borrowing enterprises. Another potentially large incentive is the carbon financing opportunities facilitated through the project. In addition, enterprises also will receive in-kind support for energy auditing arranged through PFIs as part of PFIs' marketing and pipeline development activities. The project may also explore the potential for the use of reputational incentive by certifying enterprises which have achieved large energy efficiency gains through a credible third party.
<ul style="list-style-type: none"> The proposed project focuses on supporting investments whose only benefit is derived from direct energy savings. This energy-efficiency-centric criterion may discourage investments whose main benefit is savings of material and other factor inputs. Material savings in turn yield larger savings of embodied energy. The project design should be made flexible enough to include and seek investment opportunities that capture non-energy and embodied-energy benefits. 	<ul style="list-style-type: none"> This is a false impression. While the objective of the project is to support investments whose primary benefit is derived from energy savings, it does not exclude joint benefits of other types of cost savings. The main eligibility criterion (FIRR threshold) is actually flexible enough for PFIs to select a broad range of investments which may have significant additional benefits other than energy savings. Nonetheless, the propose project will advise PFIs not to overlook subprojects which may have large materials savings with significant embodied energy savings.
<ul style="list-style-type: none"> The main text of the document, i.e., description of Project Components on pages 5-6, makes no mention of the role of GEF. It needs to provide a clear description of the GEF role in this project. This oversight may be corrected by adding a paragraph or two to describe the GEF role. 	<ul style="list-style-type: none"> This is a fully blended and fully integrated project delivered through financial intermediaries. The role of GEF is explicitly addressed in the incremental cost analysis (Annex 15). A brief discussion of the linkage between GEF barrier-removal activities and the IBRD loan supported lending is added in Para 22.
<ul style="list-style-type: none"> The sustainability and replicability sections could be further strengthened, especially on how to involve the whole banking sector. Because most banks lack technical skills and of necessity emphasize borrowers' financial 	<ul style="list-style-type: none"> As reflected by the design of Component A, the project is indeed intended for replicating PFI's best practices in additional banks and among the entire banking sector. The identification and preparation of the project

<p>credibility, it has been difficult to get them to focus on lending for energy efficiency improvements. The project's goals to introduce such plans in China are laudable. Replication and sustainability of the practices will require commitments at all levels particularly at the highest level where the main rationale for bank involvement may have little to do with energy efficiency per se. Ways to sustain non-energy-rationale will be important in order to maintain the interest in energy efficiency.</p>	<p>began with dialogues with top management of PFIs and the PFIs are driven by the potential business opportunities of engaging in industrial EC investments. In the long term, the sustainability and replicability of the project is not necessarily reflected by how many more similar subprojects will be carried out by the banking sector, rather, it is measured by the consciousness of the banking sector to consider energy efficiency as an important factor in their industrial investment lending practices. To that end this project is expected to have a significant impact.</p>
<ul style="list-style-type: none"> The technical rationale for the project is based on a consultant report. It would be very useful to provide a summary of the report in an appendix to the main report, and note its key findings in a separate section in the main text. . 	<ul style="list-style-type: none"> Agree. A relatively detailed technical annex is being prepared and will be add to the project document before project appraisal.
2. Specific Comments	
Section A: Strategic Context and Rationale	
<ul style="list-style-type: none"> Para (P).2. The term energy conservation is often used to denote energy efficiency improvement through behavioral changes (turning off lights when no one is present for instance). Unless, energy conservation is a term of art that is widely accepted to mean all aspects of energy efficiency in the World Bank and affiliated institutions, it may be better to use the term energy efficiency in place of energy conservation in the document. P. 3. Please define the word "Medium" in the title – Medium and Long Term Energy Conservation Plan. What sizes of industry are being referred to here? P. 3 A recent article notes that China's energy efficiency gains are already lagging behind the 4% annual goal to 2010. This should provide added rationale for implementing the proposed energy efficiency loan, and reference to this document should be included in the text. P.4 At several places, the document refers to official publications or some significant events. In this paragraph, reference is made to 	<ul style="list-style-type: none"> The reviewer's view notwithstanding, the project team considers that energy conservation represents a broad range of activities which lead to energy savings, including investments in renovations, which is the focus of the project. Indicated in Para 3 of Page 1. Reflected in Para 4 of Page 1. Text rephrased to reflect the reviewer's suggestions.

<p>“dramatic improvements in production capacities without significant energy efficiency improvements”. It is my understanding that this is not correct. I have provided a chart to World Bank staff that illustrates the gains made by industry in this regard. It is important to either cite the document that the proposal text is based on, or rephrase the sentence in the proposal to note that despite such improvements, Chinese industry lags behind its international counterparts.</p> <ul style="list-style-type: none"> • P.5 This paragraph should cite the earlier experience with ADB loans, and note the lessons learned from these loans. • P.7-8 Experience with industrial sector energy efficiency investments suggests that companies demand higher rates of return for investments made within the company that are primarily aimed at cost reduction. This may be due to the difference in capital and operating budgets, organizational reasons, downtime required to install new energy efficient equipment, or perceived higher technical risks. This fact should be noted in the paragraph. 	<ul style="list-style-type: none"> • ADB industrial energy efficiency loans to China targeted individual enterprises and the main benefit have been improvements in recipient enterprises. Because of such limited impact of direct lending to enterprises the proposed project has chosen instead to use the intermediary lending approach. • Reflected in updated project document.
<p>Section B: Project Description</p> <ul style="list-style-type: none"> • P.14 The reasons for the World Bank to work through participating financial institutions are well articulated in the document, and it is an effective approach to reduce transaction costs and also build capacity that may be used to spur more such projects elsewhere in China. A note of caution, however, is warranted in this regard. A similar ADB project was set up with the Industrial Development Bank of India (IDBI) in order to on-lend energy efficiency loans to Indian industry for modernization and expansion purposes in the late 1990s. The response was relatively modest, and industry was reluctant to borrow funds for this purpose. In addition, IDBI staff did not set up technical capability within the bank, which precluded further replication and 	<ul style="list-style-type: none"> • Agree and will learn more about the Indian experience during project preparation.

<p>sustainability of this effort. In part this was caused by a recession in the industrial sector in the late 1990s, but it also revealed the reluctance on part of banks to build internal technical capacity and to take on technical challenges. The key issue here is to understand the rationale for an industry to take on debt financing for technically challenging projects, and for banks to be persuaded to take on technical tasks which will require them to retrain or hire staff with technical expertise.</p> <ul style="list-style-type: none"> • The project components section is missing an explanation about the role of GEF. A paragraph or more is needed to explain its role, which is articulated in Appendix 15. • P.18 – Please check typos associated with loan amounts. • P.18 – Please explain the incentive for PFIs to supplement the IBRD loans. As I understand it, this will be a requirement in order for PFIs to receive the IBRD loan. A sentence to this effect should be included in the text. • P.25-26 These paragraphs are difficult to understand. They need to be restated in plain English so that a lay reader can understand their meaning. What is “diagnostic work and assistance”? What were the challenges? Shaped by what study? Reference? Please reword the italicized title of P.26. What was requested by the PFIs? • P.27 Please explain lending volume. Is it the total amount or per loan? What is the amount? • P.30 – Typo – difference – different • P.31 – How will the project assist PFIs to develop a robust pipeline of sub-projects? Has bringing together industry, banks, etc. worked before? It is a laudable goal but usually it is difficult to get stakeholders with such diverse interests to work together. 	<ul style="list-style-type: none"> • Already responded. • Done. • Done. • Edited. • Clarified. • Corrected. • One of the PFIs has already developed a substantial pipeline. The approach of bringing stakeholders together has been tried and proved to be successful in the First and Second China Energy Conservation projects.
<p>Section C: Implementation</p> <ul style="list-style-type: none"> • P.36 – What will be the link between this 	<ul style="list-style-type: none"> • Reflected in updated project document.

<p>project team and PFI's top management? It is critical that top management (TM) is aware of and approves energy efficiency activities. Typically, TM will have its own reasons to pursue energy efficiency activities, and unless those reasons continue to persist in the future, the replication and sustainability of future activities will be in jeopardy. How would the project ensure that energy efficiency can fulfill the current and future TM objectives? It would be useful to articulate the current and potential reasons for TM participation at the start of the project and revisit these as part of the monitoring plan of the project.</p> <ul style="list-style-type: none"> • P.41 – Check typo. – replace “would” with “will” in the first line, and what is \$3.2 million? • P.42 – Is there a reference to the government's own assessment? • <u>Table – Critical risks and possible controversial aspects:</u> I would think that the risk of slow subproject pipeline is medium and not low. I understand the pipeline is already at 30%, nevertheless industry will have high hurdle rates for such loans and a better rationale should be described if a “low” risk rating is to be retained. <p>A category of sustainability and replicability should be included in the table to note the steps being taken to bring about market transformation in the sector, and to assign a risk rating for these categories.</p>	<ul style="list-style-type: none"> • Corrected. • Clarified in the updated project document. • Modified to address the reviewer's concerns in updated project document.
<p>Section D: Appraisal Summary</p> <ul style="list-style-type: none"> • P.52 – The criteria used for accepting the FIRR rates is set too low. Most industrial projects demand a much higher FIRR for reasons noted in paragraphs 7-8 in the proposal and also above. The potential project participation rates should be reexamined using a higher hurdle rate and the number of potential projects where the FIRR exceeds this value should be recalculated. • P.53 – What is the carbon price used in this calculation? Have other (non-energy savings) 	<ul style="list-style-type: none"> • Already addressed in the general comments section. • The prevailing carbon dioxide price of US\$10 per ton of CO2 of carbon financing

<p>benefits been included in this calculation? Industry often will take on projects that produce savings beyond energy, for example, reduction in loss of material during its processing is more critical than mere energy savings. Such benefits should be factored into the assessment of the project, and in the calculation of the FIRR.</p> <ul style="list-style-type: none"> • P.54 – Please include this document or its executive summary in an appendix to the proposal. • P.55 – Please explain what the GEF grant is designated for? • P.58 – Please spell out “FI”. 	<p>project in China. Only energy savings benefit is included in calculation.</p> <ul style="list-style-type: none"> • The summary is being drafted and will be included before project appraisal. • Addressed in Annex 8 of the document. • Edited.
<p>Appendix 15: Incremental Cost Analysis</p> <ul style="list-style-type: none"> • Page 74, para 2 – What will be the share of existing capital stock in 2020? • Page 74, table – Please define “Large Enterprises” • Page 75, para 1 – and will two-thirds come from structural change? • Page 75, para 3 – Other important barriers include technology reliability, downtime, trust in technical recommendations, industry and bank capability to evaluate technical proposals. • Page 76, para 2 – What is the magnitude of self financing? • Page 77, B1 – Monitoring and evaluation will be a critical component of the role that PFIs and industry will need to play in order to ensure that energy savings are achieved as planned. This should be spelled out as a separate activity in this table. A good way to do this would be to ensure that there should be a monitoring plan prepared prior to the implementation of a project that industry borrowers should be asked to implement with verification by bank staff or third-party 	<ul style="list-style-type: none"> • About one third. • Enterprises with annual revenue of or over RMB200 million yuan. • Yes. • Agree. • There is no statistical data on this. Based on Chinese experts opinion, in the particular market segment which the project focuses on, i.e. medium and large EC investments, the magnitude of self financing is low. • Reflected in the updated project document.

<p>entities.</p> <ul style="list-style-type: none"> • Page 77, B3 – Please note the role of the top management as discussed above in P.36. • Page 77, B4 – Please describe the business models that GEF technical assistance will demonstrate. 	<ul style="list-style-type: none"> • Reflected in the updated project document • Reflected in the updated project document
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c) GEF Secretariat and other Agencies' comments and IA/ExA response

Reponses to GEF Secretariat Project Review Comments

Comment	Response	Changes Made in Documents
The proposed project will target medium-sized and large energy intensive industrial enterprises/facilities. This needs to be clearly defined at the outset (what is medium, what is large, and what are energy intensive industries). Occasionally the term "medium-sized and large energy conservation projects" is also used. Presumably, this is defined as \$5-30m per project?	<p>The size of an industrial enterprise is defined by its revenue. According to China State Statistical Bureau (2003 guideline), enterprises with revenues in the range of RMB30 to 300 million yuan are defined as medium-sized, and those with revenues exceeding RMB300 million yuan as defined as large. The proposed project will primarily focus on following energy intensive industries: iron and steel, cement, chemicals and petro-chemical.</p> <p>A more meaningful threshold is the size of an energy efficiency investment, which is defined by the estimated investment cost of a single energy-efficient technology intervention. The targeted energy efficiency investments of the proposed project range from about US\$5 to 25¹³ million, compared with small sized investments of about US\$1 million or less. This selection is based on a survey conducted among three major energy-intensive manufacturing industries in China, covering 17 energy efficient technologies for the iron and steel industry, 30 for the chemical and petrochemical industry and 9 for the cement industry.</p>	<p>A footnote is added: page 6 of the Executive Summary and page 2 of the Project Brief.</p> <p>Clarification incorporated: page 4 of the Executive Summary and page 2 of the Project Brief.</p>
It is also necessary to provide a clear working definition of what qualifies as an energy conservation project. The prodoc suggests that the focus will be on "renovation and rehabilitation activities whose	<p>The following eligibility criteria have been proposed to ensure that the PFIs will restrict energy efficiency financing under the project to "renovation and rehabilitation activities whose primary financial benefits will be derived from energy savings."</p> <p>1. The energy cost savings resulting from the subproject must yield a simple payback period of less than 10 years for the total investment cost of the subproject. In other words, the energy cost savings resulting from the</p>	<p>Clarifications have been made in the Executive Summary (footnote 7 in page 8) and in the Project Brief</p>

¹³ Note: In the PAD (page 34) we say \$5-30 million!!

<p>primary financial benefits will be derived from energy savings." At the concept stage, it was stated that at least 50% of the financial benefits would be derived from energy savings. Does this still apply?</p>	<p>subproject must be able to recoup the entire subproject investment cost within 10 years of subproject implementation. Our analysis showed that the 10 year simple payback and the “over 50% of financial benefits derived from energy savings” conditions provide similar screening results. However, we selected the former criterion because: (i) the payback formula is simpler and subject to fewer assumptions and manipulations than the calculation of overall financial returns and returns from energy savings over the life of the subproject; and (ii) the energy savings payback period of less than 10 years also is evidence of the financial viability of such energy saving subprojects whereas just because over 50% of financial benefits are derived from energy savings does not guarantee that the subproject is commercially viable (subproject FIRR could be low).</p> <p>2. Subprojects will be confined within the premises of an existing facility of the subproject owner and will not entail the acquisition of land. Greenfield subprojects will not be eligible.</p> <p>Details of how this criterion may be applied in subproject selection by PFIs will be agreed at project appraisal and a few examples will be provided. These additional details will be included in the Economic and Financial Analysis Annex in the Project Brief before CEO endorsement.</p>	<p>(footnote 6 in page 6).</p>
<p>CO2 reduction estimate: 19.5MT over 5-yr project period and 78 MT over 20-yr life span of investments. Is this based on 400m (debt) investments? Note that the discussion of sample subprojects (pp. 77-78) suggests 200m IBRD loan, 550m from local banks, plus 30% equity financing from the</p>	<p>The CO2 reduction over the 5-yr project period is 1.6 million tons CO2. Both figures, 1.6 MT and 78 MT are based on the total investment of about US\$571 million, including 70% of debt financing (\$400 million) and 30% of leveraged equity. A table detailing the assumptions and method of estimating CO2 reduction has been added to the Incremental Cost Analysis Annex in both the Executive Summary and the Project Brief.</p> <p>The quoted figure of \$550 million from local banks in pp. 77-78 of the Project Brief was an initial leverage assumption and had been reduced to \$200 million. Unfortunately, this change was not made accordingly. This mistake has been corrected.</p>	<p>Page 24 of the Executive Summary and Page 106 of the Project Brief.</p> <p>Page 77-78 of the Project Brief.</p>

participating enterprises.		
Also related to CO2 as the key performance indicator, clarify (on p.5 and also Annex 3) whether this refers to physical or economic output.	<p>The project level CO2 reduction will be estimated based on physical output, for examples, of steel or chemical products.</p> <p>For national key manufacturing facilities (broader indicator) CO2 reduction will be estimated based on either physical output or economic output, depending on the statistical data available.</p>	
P.2 (para 5) mentions "the Bank's First and Second China Energy Conservation Projects, cofinanced by the Global Environment Facility..." This seems to be a mischaracterization, since both are standalone GEF projects with no Bank financing. Please refer to these projects (p.2, p.3, p.4, p. 25, etc.) throughout the prodoc as WB-GEF or GEF-funded projects.	<p>The Energy Conservation Project (First) does include a US\$63 million IBRD loan. While the Second Energy Conservation Project is indeed a GEF standalone.</p> <p>The description has been changed accordingly in both project documents.</p>	
P.4 mentions "variable spread loan" (VSL) as the financial product chosen by the Bank. A brief explanation of VSL is in order. Also, why is it in brackets - to be determined?	A foot note is added. This proposed lending instrument needs to be confirmed and terms to be agreed during project appraisal.	
The incentive scheme (3.2m) appears to apply to both IBRD	The performance based incentive scheme is indeed applied to both IBRD on-lending and PFIs' own funds. Since every dollar of the energy conservation	

<p>on-lending and PFIs own lending (200m each) based on a mention in passing on p.103 (0.8% of loan). This needs to be made explicit in the description of the project throughout the prodoc. What about the two additional banks? It is important to create a level-playing field, and not to use GEF grant to subsidize IBRD loan (real or perceived). Furthermore, although the incentive scheme may help jumpstart EE lending, its long term sustainability is questionable and (along with the rationale) needs to be fully explained.</p>	<p>lending will be decided by the PFIs, the project does not intend to distinguish IBRD fund from PFIs' own fund. In the end, what matters is how much EC loans the PFIs are able to disburse.</p> <p>The incentive scheme is not a subsidy program in disguise. It is GEF financial support of part of the incremental cost borne by the PFIs to launch, maintain and scale-up the new energy efficiency investment lending business line. To realize the objective of a commercially viable and robust energy efficiency financing business practice with a strong pipeline of financially attractive subprojects, the project will mandate that the PFIs establish a new team or dedicated unit focused on the energy efficiency business with the commitment of relevant and adequate resources and expertise. This project requirement will cause an incremental cost to the PFIs. This incremental cost is eligible to GEF assistance. The GEF funds allocated to this purpose account of about half to two third of the direct cost of the PFI to maintain functioning business teams/units during the five years of the project period. The latter will be mandated in the grant agreement.</p> <p>However, instead of disbursing all of the GEF payment for part of the incremental cost related to the mandated units, it is proposed to link part of the disbursement to the amount of lending to EC projects. This approach would, if agreed to by the PFIs and Chinese authorities, leverage at least \$600 million in EC loans. It is expected that by maintaining a functioning team/unit for 5 years and increasing their portfolio lending, the banks will gain experience and overcome the perception of higher risk and difficulty which currently impede the sustainability of the business.</p> <p>By design, the additional banks will start EE lending operation one to two years later than the PFIs and will benefit from the early experiences of the PFIs, which will be disseminated by the project, avoiding potentially costly mistakes. Moreover, the two additional banks will receive grant-supported capacity building assistance from the project, significantly shortening their learning curve. The additional banks are not included in the incentive scheme because the</p>	
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	project does not impose on these additional banks the requirement to establish dedicated energy efficiency teams or units with the relevant and adequate resources and expertise as has been mandated for the PFIs. As the project does not impose incremental operation costs on the additional banks, no GEF funding has been allocated towards their incremental operation cost.	
For component A4 (assistance for project demo), 2 or 3 pilot projects will be developed with 1.8m GEF grant. Will they be IBRD on-lending or PFI's own lending projects or both?	This will be left to the PFIs to decide, whichever they wish to apply.	
For the policy support and CB component, please take stock of baseline activities. In particular, the WB-GEF Energy Conservation Project has supported the EC Information Dissemination Center. What's the status of this Center? How does it relate to the proposed NECC?	<p>The EC Information Center is now managed by the Energy Research Institute affiliated with the National Development and Reform Commission (NDRC). It will have no direct relationship with the newly created NECC.</p> <p>The role NECC, according to NDRC, is to assist the government implement national energy conservation programs as detailed in the National Mid to Long-term Energy Conservation Plan. The main purpose of the proposed TA to NECC in this project is to help position and build-up NECC so it can play an active and effective role in advance the Government's energy efficiency agenda.</p>	
The project intends to use carbon finance to enhance the financial attractiveness of the sub-projects, but agrees "not [to] directly support any activities related to the implementation of carbon financing for the identified	The Bank team will follow GEFSEC advice.	

subprojects." GEFSEC supports this and will appreciate being kept informed of the specific arrangements.		
<p>Some editorial suggestions:</p> <p>The UNDP-GEF End-Use Energy Efficiency Project has been referred with inconsistent acronyms (i.e., EUEEP on p. 26 and CEUEE in the list of acronyms and elsewhere). Please use EUEEP consistently, as this has been the acronym for which the project is known.</p> <p>OP = Operations Procedure or Operational Policy? (Operational Program for GEF)</p> <p>P. 30 (para 33): difference --> different</p>	<p>Corrections are made.</p> <p>OP means "Operations Procedure", unless otherwise indicated.</p> <p>Corrected.</p>	
Discuss the long-term (financial) sustainability of the NECC and funding commitment from the government.	The NECC has been approved by the State Council, including an initial roster of 80 staff. NDRC already requested US\$5 million from central government budget to cover start up cost. Most of the initial staff will be obtained through reassignments of professionals already working in various national institutes.	

Discuss the arrangement and specific activities for project replication, related to capacity building of domestic commercial banks and industrial enterprises.	The arrangement and specific activities are reflected in the detailed description of component A2 –A4 in Annex 4 of the Project Brief.	Pages 33-34 of the Project Brief.
Please specify/separate cash vs. in-kind co-financing.	Corrections made in the revised Executive Summary (Table d. page 13).	Page 13 of the Executive Summary
Local (4872sw; 5.3m) as well as international (656sw; 3.7m) consultant staff weeks and rates seem high. Please explain and justify.	<p>The rates for local and international consultants are based on current quotes of consulting firms in Bank and GEF-financed TA projects. The staff weeks are current estimates and will be firmed up during appraisal.</p> <p>Technical assistance will be mainly provided to banks. The consultants in banking sector are in general more expensive.</p>	
Incorporate lessons learned from the WB-GEF Energy Conservation Project and other relevant projects.	This is addressed in lessons learned section of the Project Brief.	Pages 7-8 of the Project Brief
Coordinate with UNDP-GEF EUEEP and discuss specific arrangements on potentially overlapping activities to avoid double dipping and duplication.	Additional discussions added in the Executive Summary.	Page 14 of the Executive Summary
Aside from UNDP-GEF EUEEP, IFC-GEF CHUEE is also of relevance to this project, as it targets	<p>Additional discussion added in the Executive Summary, page 14.</p> <p>The project team will exchange ideas and confirm potential collaborating areas with IFC CHUEE team during project appraisal.</p>	

commercial banks for EE lending. Please discuss how this project with coordinate and collaborate with CHUEE.		
Response to comments from other agencies needs to be provided.	Response to UNEP comments included in the Executive Summary.	Annex C c), page 50 of the Executive Summary.
Regarding the risk of slow sub-project pipeline, the reviewer suggested that this be changed from low to medium or a rationale for the low rating be provided. The response states that "Modified to address the reviewer's concerns in updated project document." However, the table on p.13 still has a low risk rating (with no further explanation).	Correction is made in the Project Brief.	Page 13 of the Project Brief.
<p>Earlier comments (10/30/06):</p> <p>1. Provide names and roles of participating domestic banks and discuss specific capacity building activities.</p> <p>2. Explain the replication strategy and activities and how</p>	<p>Please refer to Annex 4 (Detailed Project Description) of the Project Brief.</p> <p>Please refer to paragraph 41, page 12 of the Project Brief, or section 2 c), page 11 and 12 of the Executive Summary.</p>	

<p>their impacts will be monitored.</p> <p>3. Since the industrial sectors targeted by this project (steel, chemicals, and cement) are a significant source of POPs and other chemicals, we ask that the project consider, to the extent feasible, monitoring the co-benefits of POPs and chemicals reduction through energy efficiency improvement.</p>	<p>Points taken and will take into consideration in monitoring and evaluation activities.</p>	
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Response to UNEP Comments

UNEP Comments on Project Submitted for Work Program Inclusion
GEF SEC Project ID: 2951
Project Title: China Energy Efficiency Financing

1. After the implementation of projects directed to support small and medium sized commercial energy conservation projects through performance contracting, this project wants now to address large scale energy efficiency projects in large industry. This concept of "large scale energy efficiency project" should however deserve more explanation: a large scale project in a large industry might well be the result of a number of small scale interventions which could perfectly be suitable with an ESCO approach (in fact even large projects can be financed by ESCOs, depending on the ESCO size). A single large scale Energy Efficiency (EE) project can often be a process restructuring which raises the issue of what is the EE component and how it should be taken into account in the financing scheme, or a supply side investment (for example, the refurbishment of a power plant) which may raise an eligibility issue (for instance, coal power plant rehabilitation). In any case, it should be recommended to better specify the nature of the targeted EE projects.

Response: The size of the EE investments of the proposed project is defined by the estimated investment cost of a single EE technology intervention, ranging around US\$5-25 million. A survey was conducted among three major energy-intensive manufacturing industries in China, covering 17 technologies for the iron and steel industry, 28 for the chemical industry and 9 for the cement industry. Examples of the surveyed technologies include coke dry quenching, blast furnace top-pressure recovery turbine, scrap material pre-heater for electric arc furnace, high performance heating furnace, isothermal CO converter for ammonia production, ion exchange membrane NaCl electrolysis bath for caustic soda production, installation of turbo-expander in top gas line of deemphasizing column in naphtha cracking process, fluid catalytic cracking unit power recovery system, medium-to-low temperature flue gas power plant (cement production), and introduction of clinker pre-grinding roll crusher. A summary of the survey will be included in the project appraisal document. The difficulties for an ESCO to take on such investments are already discussed in the main text of the Project Brief.

2. Project preparation is estimated at around US\$ 1.2 million, with only vague indications regarding how this amount will be found. The risk is therefore long delays impede the progress of the project through the pipeline.

Response: This appears to be a misunderstanding. In Annex 11 of the Project Brief, there is an account of Bank funds expended to date on project preparation:

1. Bank resources: \$400,000
2. Trust funds: \$180,000
3. Total: \$580,000

Item 3 is actually the sum of items 1 and 2 and represents funds already spent on preparation of the project. In fact, the preparation of the project is fully funded, has been progress as planned, and is expected to be appraised in June/July 2007.

3. The main interest of the proposed concept is in fact an IBRD dedicated loan to the Chinese government, to be on-lent to one or two domestic banks. There is however no indication regarding the Chinese government endorsement or the internal approval process with the IBRD (just said it is planned in late 2006 (!) or 2007). Considering the usually long internal and negotiation time frame of the Bank, one can wonder whether it would not be preferable to request this pipeline entry approval when more clarity can be given regarding the status of the IBRD loan and how it is coordinated with other similar initiatives from other organizations (for instance, soft dedicated credit lines established by bilateral agencies such as KfW, AfD and others).

Response: The proposed IBRD loan is in the agreed lending program between GoC and the Bank and is slated for delivery in the Bank's FY2008 (July 1, 2007 to June 30, 2008). To the project team's knowledge, and confirmed by GoC, there is no other similar initiatives from other organizations.

4. Projects components are otherwise very classical. It should be demonstrated during project preparation why components II, III, IV are still needed against the Chinese background and who would be the most appropriate Chinese partners in this respect. In any case, the huge foreseen budget (13.5 million) looks dramatically overestimated.

Response: The proposed project was initiated by GoC, and has been designed and prepared with close involvement of GoC to address critical gaps in the government's industrial energy conservation program. The current list of activities proposed for GEF support only represents a portion of the activities proposed by GoC. The proposed GEF grant amount is estimated based on incremental costs of individual activities and is about one third of the total incremental cost. A significant amount (about one third) of the grant is tied to the energy efficiency loans made by participating banks, providing a direct and large leverage on immediate industrial energy efficiency investment (about \$1 grant for \$100 loan). The support for the Government focuses on new EE institution (the National Energy Conservation Center) and key initiatives (the 11th Five-Year Plan) that will have large and long-term impact on reducing the energy intensity of the economy.

Regards,

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